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THE EASTWARD EXTENSION OF PUEBLOAN DATINGS TOWARD CULTURES OF THE MISSISSIPPI VALLEY

ALEX D. KRIEGER

THIS article is based on an address to the Society for American Archaeology at its annual meeting on May 17, 1946 at Indianapolis. A following address by Dr. Waldo R. Wedel dealt with the chronology of central Plains cultures. As the two chronologies embraced a very considerable portion of the United States and were in rather remarkably close agreement, it was suggested by retiring editor Byers that they be published in this journal.

The general correspondence of our chronologies should provide an interesting and instructive check on the dating of the cultures involved, for neither depended upon the other. It has been my great privilege, and much to my benefit, to have conversed and corresponded with Wedel from time to time on archaeological problems of the Plains, but neither of us has been led by the other toward the conclusions reached in these addresses. This is not to say, of course, that further investigations will not change the picture significantly; indeed, this is to be expected. On the other hand, what can be said now with reasonable assurance lends considerable promise that the time is drawing near for an accurate and reliable dating of cultural developments in the central and southern Plains, as well as in the Mississippi Valley.

The accompanying map and chart (Figs. 49, 50) have been simplified from those presented at the Indianapolis meeting.

The desirability of an accurate chronology in discussing cultural relationships need hardly be mentioned. Without it, speculation on the time, nature, and strength of culture contacts between our major archaeological provinces can hardly proceed on a realistic basis. A reasonably sound chronology is also necessary for an estimation of the rate of cultural development in any given area, and for the probable rate of spread of a particular trait or complex of traits.

The information given here is based on an extended study now in press.[1] Therefore, I will present only the conclusions of most general interest; the detailed evidence and alternative interpretations will be found in the extended study.

Northern Panhandle. Considering first the northern Panhandle of Texas, there is an extremely interesting body of material which undoubtedly holds many clues to cultural relationships between the Puebloan Southwest and the central and southern Plains in pre-Caucasian times. The presence of masonry buildings along the Canadian River and its short tributaries (Fig. 49) has long been known to archaeologists. Our chief authority is Mr. Floyd V. Studer of Amarillo, while Moorehead, Mason, Holden, and Johnson have also published reports. The best-known ruins are those of Antelope Creek, Alibates, Saddleback, and Ruin No. 55. Extended excavations would aid in rounding out our knowledge of the culture represented by these buildings, but certain masonry forms and artifact types occur together in several of the chief ruins. For this material the name Antelope Creek focus has been proposed.

In the nature of its numerous artifacts of bone and antler, as well as those of flint and other stone, in its use of a single, utilitarian pottery featured by over-all cord-marking, and in its joint dependence on agriculture and the hunting of bison and other animals, Antelope

[1] Krieger, Alex D., *Culture Complexes and Chronology in Northern Texas.* University of Texas Publications, No. 4640. Austin, 1946.

Creek focus is clearly a close relative of the Upper Republican culture (or aspect) of Nebraska and Kansas. The cord-marked pottery lacks, however, the thick rim with incised lines so typical of Upper Republican, the jars being more similar to Basket-Maker III and Pueblo I cooking vessels in shape. On the other hand, compartments between the larger ones; division of large rooms into smaller ones with secondary walls; plastering of walls, floors, and fire basins; use of twin compartments flanking an eastward-pointing ventilator;[2] and presence of four centrally placed roof supports about a central firebasin. A square, raised clay bank at the

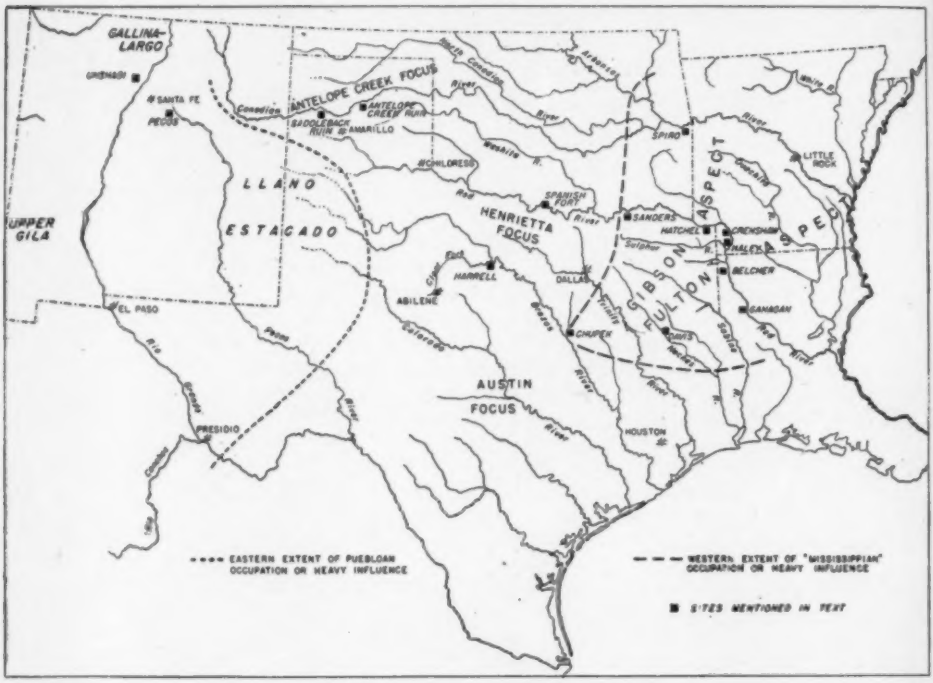

FIG. 49. General map showing areas, culture boundaries, and key archaeological sites mentioned in connection with the eastward extension of Pueblo dating.

many architectural elements point toward a rather intimate relationship with late Pueblo III and early Pueblo IV buildings in north central New Mexico about 300 miles directly west, i.e., in an area reaching from Pecos Pueblo northwestward to Unshagi in the Jemez Mountains, and on into the Gallina-Largo district. These elements include the basic idea of a multiple-roomed pueblo (without, however, any known arrangement of social or ceremonial significance, or the building of more than one story, in the Panhandle); walls constructed of unshaped stones set in large quantities of adobe; square to rectangular rooms with the use of oddly shaped rooms or west wall, opposite the ventilator opening, is also occasionally found in these rooms and suggests an altar.

The opinion may be ventured that Antelope Creek focus represents a Plains bison-hunting and agricultural population basically very similar to Upper Republican, which wandered into the Canadian valley and there came into con-

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The openings and long, extended tunnels on the east side of typical Panhandle rooms have usually been termed "entrances." Upon being shown several of these by Mr. Studer, however, I agree with him that they are much more likely ventilators. Their floors are flat and do not slant or bend upward, as in the Southwest.

tact with Puebloan civilization as it was expanding eastward toward the end of the Classic or Pueblo III period. Puebloan remains are not known, however, to extend across northeastern New Mexico, and the relationship seems to have been rather one of trade plus the borrowing of an architectural style, without

That the Canadian Valley villages were abandoned at about 1450 is shown by a general lack of later Puebloan pottery in them, and by the records of the Coronado expedition, which encountered only nomadic Apache bison-hunters in this region in 1541. There is some evidence of an extended drought at about this

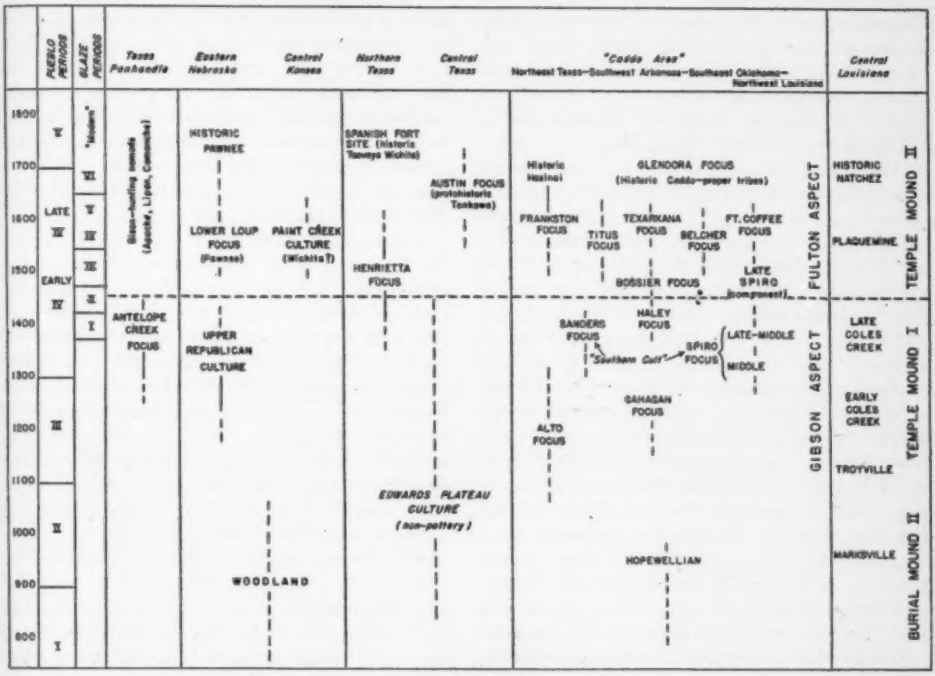

FIG. 50. Simplified provisional alignment of known pottery-bearing cultures from central New Mexico to the lower Mississippi valley, including the central Plains.

affecting the remainder of the Antelope Creek culture. Trade with the Puebloans is seen in the occurrence of turquoise beads, obsidian, and potsherds centering about the Rio Grande glazes of periods I and II, but also including St. Johns Polychrome. The time of these trade relations may therefore be set at approximately 1300 to 1450 A.D., and it is also probable that some time previous to 1300 should be allowed for the formation of Antelope Creek culture before Puebloan trade was initiated. The strong similarities with Upper Republican further suggest that it existed synchronously with Antelope Creek focus, i.e., over the period 1300 to 1450, but it may also have been in existence longer.

time, many of the ruins having been filled with wind-blown sand while the walls were still intact. This is particularly interesting, since it evidently agrees in time with the droughts in western Nebraska which Weakly has dated at 1439–54 and 1459–68 A.D. Furthermore, Wedel has shown that Upper Republican sites in southern Nebraska are covered by a dust blanket which must have begun to accumulate at least 400 years ago, and that this phenomenon may be connected with the disappearance of Upper Republican culture from this area. Thus, in both the Canadian river valley of the Texas Panhandle and the High Plains of Nebraska there is evidence of abandonment of native agriculture, due to droughts of extreme

severity. At present it appears that these events were concurrent and may be dated at about the middle of the fifteenth century. Enemy inroads may also have contributed to the disruptions of cultures at this time. We have mentioned that Coronado found only Apache bison-hunters in the Panhandle area in 1541.

The Llano Estacado. Well south of the Canadian, on the Texas side of the great grassy steppe known as Llano Estacado (Fig. 49), there are numerous camp sites on which potsherds are found. So far as known, all this pottery is of common Puebloan types made in central and southern New Mexico. Though barren, the Llano now receives about twenty-five inches of precipitation annually and supports extensive crops of corn, cotton, and wheat. As throughout the High Plains, native agriculturalists probably found it impossible or impractical to break the sod. However, in the Llano there are large tracts of low sand hills and dunes where tillage is easy and water is retained near the surface. These tracts are marked by tall-grass cover and dense thickets of a scrubby shin-oak, whereas the rest of the Llano (and the High Plains in general) supports only a short-grass cover. On the Llano there are also numerous depressions, some quite large, which contain shallow lakes that rise and fall according to the rainfall received; small seeps and springs may be found in the banks of these depressed basins, and a few tiny streams also flow eastward to form the heads of the Red, Brazos, and Colorado rivers of Texas.

It is precisely about these arable sandy tracts, seeps, springs, and lakes that camp sites are found which yield artifacts remindful of Puebloan remains in eastern New Mexico. The pottery runs strongly to Chupadero Black-on-White and El Paso Polychrome (almost always occurring together), and also includes glaze-paints of Glaze periods I to III, and Lincoln Black-on-Red. Mano and metate fragments are numerous and reveal a back-and-forth motion on a flat slab. Small projectile points agree in form with those found by Mera in late Puebloan sites in central New Mexico. Due to a dearth of native rock, caliche was used for hearth stones, while other materials for grinding and chipped artifacts were imported.

It has often been suggested that the Puebloan-like remains of the Texas Llano mark the temporary camps of Puebloan groups from farther west who traveled into this area on seasonal bison hunts. While this may apply to some of the remains, it is my impression that Puebloan occupation was more extensive than this, and that parts of the steppe were actually farmed, perhaps by more or less permanent residents. Certainly the region was extremely uninviting, even to the Puebloan farmer. It therefore is likely that the occupation was forced, and we find a plausible reason for it in Mera's conclusions for central New Mexico; there, a large number of sites seem to have been abandoned during the fifteenth century, probably because of enemy inroads. Since the dates agree, it may be suggested that the Llano Estacado of Texas was farmed in favorable spots by the remnants of Puebloan farmers forced out of central New Mexico during an early Pueblo IV period.

The eastern boundary of this occupation in Texas coincides in general with the eastern escarpment of the Llano (Fig. 49). Farther east, there is nothing to suggest an actual Puebloan occupation, although Puebloan trade pottery and limited influences may be traced across Texas to about the Louisiana border. There are thus two quite distinct belts of Puebloan connection in the cultures of the northern half of Texas: (1) a northern one involving the Canadian Valley masonry villages and the upper Rio Grande district of north central New Mexico, and (2) a southern one involving the Llano Estacado, north central, and northeastern Texas with the central and southeastern portions of New Mexico. In both cases the trade and influences, such as they were, seem to have extended along east-west lines only. In Trans-Pecos Texas, west to the Rio Grande, Puebloan connections with south central New Mexico were particularly strong, but this area is beyond our present consideration.

Abilene area. In the eroded basin immediately east of the Llano Estacado, few collections have been made and little can be said of the archaeology. Still farther east, about the city of Abilene and the Clear Fork of Brazos River, Ray and Sayles have done extensive work. Pottery-bearing sites are again found in sand-hill country where rain waters are retained near the surface and support tall-grass cover and shin-oak thickets. There seems to be little if any indigenous pottery. A few examples of Chupadero Black-on-White and glaze-paints from the west have been found, while sherds of Frankston focus types indigenous to the Neches Valley far to the east are fairly common. Two

or three sites in the Abilene area have yielded artifacts and shell-tempered pottery typical of Henrietta focus (see below) and appear to mark the western limits of this Plains culture.

North central Texas. In the valleys of the upper Red and Brazos systems, many hundreds of small camp sites consistently yield the same artifacts and belong to what I have called Henrietta focus. Like Antelope Creek focus in the Texas Panhandle, this culture is definitely Plains-like in its economic life and artifacts, showing many affinities with Upper Republican. Village refuse is found on low sand hills and along the banks of numerous small streams. Agriculture was combined with the hunting of bison and deer, while various small animals, birds, turtles, and fish were also taken. Flat grinding slabs and mano used with back-and-forth motion in the Pueblo manner are common in these sites, while milling stones with oval basin and stream-pebble manos used with rotary motion are also found. Hoe blades were fashioned from bison scapula and from a section of bison skull cut from the horn base; scapulae were also used for knives and for scrapers of draw-shave form. Small triangular projectile points, both plain and side-notched, are common, as are snub-nosed scrapers and drills of flint, and a great variety of well-made bone awls, bone beads, etc. An interesting feature is the making of small, sharp hematite celts. Pottery seems to have been exclusively utilitarian, mainly in the form of jars, and was almost entirely shell-tempered and plain. Sherds apparently fabric-marked are found rarely on the sites, but their affiliation is unknown. A series of burials at the Harrell site, at the junction of Brazos River and Clear Fork, revealed both single and multiple burials in flexed position, without offerings. Several of these burials were placed in rude box-like arrangements of limestone slabs, a practice suggestive of Middle Mississippi culture in Tennessee and Kentucky.

Henrietta focus is not known to extend into historic times and differs in many respects from historic Wichita remains at the Spanish Fort site in this area. Mr. A. H. Witte has found sherds of Chupadero Black-on-White in Red River components of the focus, indicating a date of about 1500 A.D. This and other considerations suggest that the focus existed from about 1400 or 1450 to about 1600. It appears to fall into a somewhat later horizon than Antelope Creek focus and the Upper Republican culture, perhaps pointing to the gradual southward spread of the same general mode of life reflected in the latter. Shell temper in the pottery also suggests a later horizon, one correlating better with the Paint Creek or Quivira Wichita remains of central Kansas, and with protohistoric Pawnee; according to Wedel these probably fall into the sixteenth and seventeenth centuries.

Components of Henrietta focus extend as far westward as Abilene, as mentioned, and up the Red River Valley to the southeastern corner of the Panhandle. Around Childress there are found some numbers of Puebloan trade sherds, chiefly Chupadero and glaze-paints. The cord-marked pottery of Antelope Creek focus also occurs in quantity southward to this vicinity, and a thorough survey might be expected to produce important clues to the dating of cultural remains from both the Southwest and the Plains.

At the Spanish Fort site on Red River, occupied by Wichita groups about 1750, there occurs both Tewa Polychrome from northern New Mexico, and Natchitoches Engraved, an historic Caddo pottery centered in northwestern Louisiana. This chronological agreement is to be expected, but it is interesting to find one site where eastern and western trade met.

Over a large part of central Texas, an Austin focus has been related to the protohistoric Tonkawa tribes by J. Charles Kelley of the University of Texas. Artifacts of this focus may be found as far north as Henrietta focus territory, where they seem to be of somewhat later date. Austin focus pottery is quite distinct from any of the Caddoan, Plains, or Puebloan traditions and may point toward the Texas Gulf Coast for its origin. At any rate, pottery was of very late appearance in central Texas.

Northeast Texas. Northeast Texas is part of a much larger region popularly known to archaeologists as the "Caddoan area," which embraces adjacent portions of Texas, Louisiana, Arkansas, and Oklahoma. The heavy line on the right side of the map (Fig. 49) marks the approximate western boundary of the "Caddoan area," and also of the "Mississippi pattern," to which the later remains may be said to belong. Cultural material east of this line is rather sharply distinguished from the Plains-like material west of it, just described. The "Caddoan area" is so named because it was the general homeland of the "Caddo proper" or southern branch of the Caddoan linguistic

stock, the others being the Wichita, Pawnee, and Arikara. From this linguistic relationship it might be expected that the archaeological cultures referrable to the southern tribes would show much in common with those of the Plains. However, this is not the case, for the distinctions far outweigh the similarities. The problems are very complex, and we need to understand how much of the material from the "Caddoan area" can be referred to the known tribes of the area, and something about their age.

Archaeological investigations have been carried on for many years in the "Caddoan area," but only recently has a fairly coherent picture evolved. There can now be recognized at least twelve cultural foci, and others are emerging. These foci readily divide into two groups (aspects) representing two time horizons. The earlier, for which I have suggested the term Gibson aspect, includes the Spiro, Haley, Sanders, Gahagan, and Alto foci. The later, or Fulton aspect, includes the Texarkana, Titus, Frankston, Bossier, Belcher, Fort Coffee, and Glendora foci, while D. A. Baerreis recognizes a McCurtain focus in southeast Oklahoma, and Dr. and Mrs. T. L. Hodges of Bismarck, Arkansas, recognize a "Mid-Ouachita focus" in central Arkansas, both of which appear to me to fall into the Fulton aspect.

The relative chronological position of the two aspects is amply demonstrated by (1) the recognition of trade pieces from one focus to another within each aspect, and (2) stratigraphic superimposition at certain key sites. Thus the culture sequence at the famous Spiro site in eastern Oklahoma shows an early occupation with pottery related to the Coles Creek period in Louisiana, a subsequent one characterized by the rich ceremonial complex which Orr calls Spiro focus (i.e., the Middle period, divisible into a time of ceremonial efflorescence, and a Late-Middle period of ceremonial decline), and finally a very different culture which he calls Fort Coffee focus, showing affinities with the McCurtain and Texarkana foci to the south, and late Plains cultures to the northwest. At the Sanders site near Red River in Texas, a Sanders focus component closely related to the Late-Middle period of ceremonial decline at Spiro was overlain by materials referrable to the Texarkana, Titus, and Henrietta foci. C. B. Moore's excavations at the Haley site on Red River in Arkansas uncovered a distinct complex of large graves, vessels, and other artifacts which we now call Haley focus. At the nearby Hatchel site in Texas, W.P.A. excavations revealed two superimposed flat-topped "temple" mounds with Haley focus pottery, the whole surmounted by a great mantle of midden material 14 feet thick at the center and bearing Texarkana focus pottery, graves, and houses throughout; on the surface of this mound there were also Glendora focus potsherds, but no evidence of European contact. (Elsewhere, Glendora material is usually found associated with European trade articles.) Again, the Crenshaw mounds, opened by Moore and later excavated more thoroughly by Judge Lemley, contained three superimposed cultures: a series of large graves with Coles Creek-Troyville vessels, a later series of similar graves with Haley focus vessels, and lastly a surface occupation with mixed Belcher and Texarkana focus pottery and other artifacts.

At the Belcher site on Red River near Shreveport, Dr. Clarence Webb has found four cultural levels, the earliest probably representing Haley focus, the second possibly Bossier focus, and the upper two forming the type site for Belcher focus. Dr. Webb, following C. B. Moore, has also done extensive work on the Gahagan mound in Louisiana, enlarging our knowledge of this unique site. It bears relations to Haley focus in the great rectangular graves with rows of extended skeletons and offerings piled about the walls, and in the pottery it lies closest to Alto focus; however, there are many distinctive features and the site forms the only known component of Gahagan focus.

On the Neches River in central east Texas, a large temple-mound site on the Davis place was excavated by W.P.A. crews under Perry Newell. For the most part this site forms the type component for an Alto focus, but there was also a surface occupation by Frankston focus peoples, Frankston components being very common in the Neches Angelina, and upper Sabine river valleys. It is also of unusual interest that Mr. Frank H. Watt of Waco, Texas, has found one site almost on the Brazos River (Chupek place) which yields numbers of Alto focus sherds. At the Chupek place, however, there is no evidence of mound building, and the Davis site remains the most southwestwardly point at which mound building is known for the entire eastern United States area; that is to say, it is probably the first intentionally built temple mound (or mound of any kind) that one meets in the

United States as one travels toward the Mississippi Valley, and as such it may have important bearing on the question of cultural relationships with Middle America. Briefly, there is some evidence at the Davis site that a decorative technique of engraving very fine lines on dark, highly polished vessels was present at a considerably earlier time than yet suspected. Sherds of this kind were found underneath the temple mound, in a village which also included examples of sand-tempered ware as well as stamped and incised sherds of Marksville and/or Troyville types. Should this association be proved beyond question, it might indicate a connection between Alto focus peoples and one of the middle horizons of southern Mexico. Because of the associated potteries just mentioned, Alto focus has been entered at a somewhat earlier date than the other foci of the Gibson aspect on the chart (Fig. 50). A similar position is indicated for Gahagan, since its sparse pottery is entirely of Alto focus types.

Time will not permit a discussion of the many differences between the two aspects, as well as the similarities and continuities between them. In many respects the earlier or Gibson aspect is the richer, both in a gross sense and in the possession of ceremonial material. Thus Spiro, with its incredible ceremonial complex, gives way to a much simpler culture which seems to possess no vestige whatever of the "Southern Cult." Elsewhere, as in the McCurtain and Belcher foci, there seem to be lingering traces of the "Cult" and of such practices as multiple interments in large graves, and mound building.

The principal purpose of this study has been to extend Puebloan datings eastward to the "Caddoan area" and the Mississippi Valley cultures, and we find that this can be done in a fairly satisfactory manner with the later of our two horizons. This applies particularly to the foci of the Fulton aspect in northeast Texas and, by extension, to those cultures which are contemporaneous with them farther east and north. Very briefly, the principal arguments are as follows:

1. The followers of De Soto under Moscoso, in attempting to reach Mexico City overland from the Mississippi in 1542, probably passed across northern Louisiana and entered present Texas as far as the Trinity River before turning back. The names of "nations" or important towns recorded in this region are, according to Swanton, undoubtedly Caddoan, many of them appearing as cognates in La Salle's time over 140 years later. From the archaeological point of view, we believe that the peoples met were those represented by the Belcher, Titus, and Frankston foci.

2. The Moscoso records state that some of the last tribes met on the westward trek had obtained cotton blankets and turquoise from other peoples far to the west. In support of the indicated trade with Puebloans by 1542, we have record of five trade sherds found with Titus focus materials; these, however, seem to belong to fifteenth century rather than sixteenth century types in the Southwest, and point toward the Upper Gila country.

3. A number of vessel forms found in Belcher and Titus pottery are very unlike Southeastern wares and bear a general resemblance to Upper Gila pottery of the fifteenth century or perhaps somewhat earlier.

4. There is a very close similarity in the shape of bowls at Pecos during Glaze periods III to V, and those of Texarkana focus about the great bend of Red River. (This might apply also to Baerreis' McCurtain focus.)

5. Neck-banding and neck-corrugation of utility jars is a fairly common trait of the Frankston, Titus, Texarkana, and McCurtain foci in northeast Texas and extreme southeast Oklahoma, but is not found farther east in Louisiana and Arkansas or elsewhere in the eastern states. The techniques are remindful in some ways not only of Mogollon Alma jars and Basket-Maker III—Pueblo I treatments, but also of certain jars in northeastern Arizona in early Pueblo IV times; presumably the latter agree better in time, but the problem requires more work.

None of the above points would bear much weight by itself, but collectively they indicate that Puebloans and Caddoans of the Fulton aspect were in communication and influenced one another to some extent in their ceramic traditions. The evidence is that this communication was in effect for at least a century prior to 1542, and therefore 1450 A.D. may be taken as an approximate "beginning date" for the Fulton aspect horizon.

As yet there is no means of dating the Gibson aspect horizon with any precision, except to say that it certainly antedates the Fulton. The one did not evolve into the other over night, and I think that the Gibson aspect as a whole represents as great a length of time as the Fulton, if not a greater one. Therefore, if it be acceptable that the Fulton aspect covers three hundred

years (*ca.* 1450 to 1750), an approximate range of 1150 to 1450 A.D. is indicated for the Gibson. According to this reckoning, the "Southern Cult" material at Spiro probably falls between 1300 and 1400 A.D., possibly closer to 1300.

There seems to be no evidence of borrowing or contact between Gibson aspect foci and the Southwest. This also seems to be true of Upper Republican, where communication with the east and southeast may be seen, but not with the west. Hence, in the Southwest, Plains, and western parts of the Southeast, the similarities were evidently due to late communications rather than to the presence of a "basic culture." Or, if a "basic culture" existed, it has yet to be recognized and defined.

Correlations. The chart (Fig. 50) gives a simplified view of relative temporal position of pottery-bearing cultures from central New Mexico to the Mississippi. They divide into two very general horizons. The earlier includes Antelope Creek focus, Upper Republican (and, probably, Nebraska aspect), and the five known foci of Gibson aspect. The later includes the Pawnee cultures, Paint Creek of central Kansas, Henrietta focus, and the seven or more foci of Fulton aspect, which extends into European times with the Glendora focus. These two general horizons also correspond with the two great Temple Mound periods in the eastern states, as described by Ford and Willey. That is, within the Fulton aspect there are a number of traits tending to tie in with Middle Mississippi shell-tempered pottery while in the Gibson aspect there is a definite tie-in with such cultures as Coles Creek in Louisiana and Weeden Island in northwest Florida. Added to this is the problem of the origin of polished and engraved decorative pottery, a tradition which above all characterizes the "Caddoan area," and sets the two aspects off from any others in the "Mississippi pattern"; this, however, is a problem deeply concerned with Middle American archaeology and is being attacked by several persons.

As a final word, I may say that the chart (Fig. 50) gives what I think is a very conservative dating of the cultures mentioned. For a number of reasons, it seems possible that the datings might eventually be set back somewhat, while it appears unlikely that they can be advanced. There is a respectable amount of cultural evolution all through these regions, and all of it took time.

Anthropology Department
University of Texas
Austin, Texas

CULTURE CHRONOLOGY IN THE CENTRAL GREAT PLAINS

WALDO R. WEDEL*

ARCHAEOLOGY in the central and northern Great Plains stands today on the threshold of what may be its outstanding opportunity for sustained achievement. The intensive field investigations so auspiciously launched in Nebraska, Kansas, and the Dakotas in the decade before the war, have been at a virtual standstill since 1940; and with the rapid expansion of the nation's armed forces and defense industries, the number of students and laboratory workers available for study of the accumulated data and collections, dwindled nearly or quite to the vanishing point. Here and there, a few individuals found it possible, intermittently and subsidiary to war-connected activities, to carry on limited researches. Despite the necessarily discontinuous character of much of this war-time work, it has not been without its professional rewards. In due course, the various workers concerned will make these findings a matter of record, and will indicate fully their relevance to the basic problems of dating and of correlating Plains archaeological cultures over a wide area. In the interim, as we look ahead to the possibilities of post-war archaeology, particularly in connection with proposed river valley development, it may be worth while to take stock briefly of where we stand with respect to these chronological matters.

The remarks that follow relate primarily to the Kansas-Nebraska region, and especially to certain late prehistoric and protohistoric semi-horticultural complexes therein. It is one of the more satisfying aspects of archaeological research in this area that it promises important leads to culture chronology not only within but also well beyond its borders.

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It is apparent, I think, that the general sequence of cultures in the Central Plains, as outlined by Strong (1935, pp. 271–8) and amplified by later workers (Wedel, 1940, and 1943, pp. 214–17), will stand. The relative chronology, insofar as it involves the relation of any one recognized horizon to another, is therefore established. Since prehistory gains in proportion to the preciseness of its chronological machinery, we may inquire next whether, or to what extent, it is possible to date any of these major culture complexes in terms of our Christian chronology.

There are several lines of approach to this problem. In the first place, we are dealing in part with aboriginal groups in contact with white man. Where these contacts were demonstrably direct, and took place after *ca.* 1775–1800, relatively precise dates can often be assigned to particular sites, and accurate ethnohistoric ascriptions are possible. The Pawnee are at present the only Central Plains tribe whose datable sites have yielded a definitive body of culture-indicative aboriginal material. For such less populous Siouan groups as the Kansa, Oto, Omaha, and Ponca, who appear to have been less able to resist the impact of the white man on their native culture, the picture is much more blurred. On the eastern edge of our area, thanks to the meticulous work of Berry and his colleagues in Missouri, Osage archaeology seems about to get on its feet.

For earlier post-Caucasian sites, what is called for is a thorough-going collation of early Spanish and French documents with archaeology. Preliminary attempts along this line, particularly in the western Plains area, look promising, but more work is urgently needed. I shall seek to show the possibilities in a later passage.

Two other chronological devices remain to be noted. One is the recurrence of datable Puebloan potsherds in Central Plains village sites of divergent cultural affiliations; the other is dendrochronology. From cross-finds of Puebloan sherds, it is possible to make reasonable inferences as to the time of certain occupations and the nature of Plains-Southwestern contacts. Where these occupancies and contacts took place in post-European days, the findings of archaeology promise to amplify the intriguing but all too brief ethnographic descriptions of Plains Indian life as recorded in sixteenth, seventeenth, and eighteenth century Spanish documents. Such cross-finds, it should be noted, are not yet numerous; in proportion to what remains to be done on the problem of chronology they are few indeed. But in proportion to the very limited work that *has* been done, their recurrent presence on certain levels inspires confidence. As to dendrochronology, it must suffice to say that in western Nebraska (Weakly, 1943) a tentative time chart, based on red cedar and ponderosa pine, has been advanced; that it extends back to the early fifteenth century; and that rather promising efforts have been made to link it with local complexes and sequences. Until this time chart has been independently verified, correlations made therewith must be regarded as subject to revision and even, perhaps, to partial or complete abandonment.

In the suggested correlations that follow I wish to emphasize their provisional nature. Where initial and terminal dates are suggested for a specific horizon, these are not to be regarded as established beginning and ending dates. Our information on the complexes involved is not yet precise enough, if indeed it ever will be, to permit us to say that what we call "Culture X," for example, began or ended abruptly at a given time, or that some sites belonging thereto were not inhabited before or after that time. The figures imply only that on present evidence most known sites of that complex—in other words, its culmination or period of strongest flowering—appear to fall within the dates suggested. By how much an occasional site may lie outside the period indicated I would not presume to guess at this time.

It is generally recognized by Plains workers that the slabhouse villages of the Canadian River drainage in Panhandle Texas (see, e.g., Holden, 1929, 1930, 1933; Moorehead, 1937, pp. 92–116; Studer, 1934; Johnson, 1939) are related to the widespread Upper Republican horizon of Nebraska and Kansas. To be sure, the architectural traditions of the Panhandle culture—Krieger's proposed Antelope Creek focus—diverge rather widely from the earth-covered pithouses characteristic of Upper Republican sites. The pottery, stone work, bone and antler, and other artifact types from the two horizons are quite similar, however, and in both the economy was based partly on hunting and partly on corn-growing. The Panhandle culture, as Krieger has suggested, looks like an Upper Republican complex with a modified form of Puebloan architecture. From published accounts it is not yet clear whether the physical

relationships of the people were strongest with Plains, Southwestern, or other groups.

For our present purpose, it should be noted that several Canadian Valley sites have yielded Puebloan sherds. Krieger (1946) observes that these are mostly of period A Biscuit Ware and Rio Grande Glaze periods I and II. Other sherds from a house floor in an unpublished site near Optima in Texas County, Oklahoma (Clements, 1945) have been identified by Mera as "probably Rowe Black-on-White," dating from the late thirteenth century (Mera to Wedel, letter of Nov. 23, 1945). Sherds of later type, some of them perhaps left by hunting or trading parties of Pueblos, were also present at the site, though not in house structures, and so the evidence is not as clear-cut as we would wish. The general impression from cross finds of Southwestern sherds is that the Canadian Valley sites may be assigned to a period of *ca.* 1275 or 1300 to *ca.* 1450 or 1475. This estimate is partially corroborated at its upper end by the historic circumstance that the Coronado party traveled through or very near the region in 1540, but left no record of anything resembling these slabhouse villages. I think we are safe in inferring from these two lines of evidence that the Antelope Creek focus was defunct, at the latest, by *ca.* 1500.

Farther north, the general position of the Upper Republican horizon in the Central Plains culture column seems clear enough. So far as I am aware, however, no Puebloan sherds, datable or otherwise, have yet been uncovered in an Upper Republican site. A single sherd from the surface of an Upper Republican-like site in Marshall County, northeastern Kansas, has been identified by Amsden (letter to Haury to Hill to Wedel, Mar. 26, 1937) as Wiyo Black-on-White, also a late thirteenth century type. Since the actual association of this specimen with the site complex is beclouded with uncertainty, I do no more than mention it.

On present evidence there is no reason for doubting that the Upper Republican horizon is pre-Caucasian, at any rate as it is known from the western portion of its range. Sites are plentiful; they are probably spread over a fairly long period of time, and evidently include several variants. Sites west of the 100th meridian were in all likelihood abandoned by *ca.* 1500. Farther east, where the genetic relationships of Upper Republican to Lower Loup materials remain to be worked out, there may well be later variants. The St. Helena focus (Cooper, 1936) is possibly one of these. There is no reason whatever to suppose that any of the village sites in Kansas or in southwestern Nebraska now classed as Upper Republican were inhabited by the time Coronado reached the great bend of the Arkansas. My feeling is that the maximum westerly extension of the Upper Republican coincided roughly with the major occupation of the Antelope Creek focus sites. The occurrence of scored rib artifacts in several Antelope Creek focus sites perhaps hints at a slightly later time range than that of Upper Republican. At Pecos and in the Central Plains, these implements have been reported so far only in post-European horizons; they are absent from Upper Republican.

In central Kansas, the surveys of the National Museum have added much to our knowledge of a moderately widespread native culture that extended into the early post-European contact period. As I have indicated elsewhere (Wedel, 1942) there seems good reason to believe that this culture is to be identified with the inhabitants of "Quivira," visited by Coronado in 1541 and again by Oñate in 1601. Remains of the dwellings have not been found, but refuse mounds and an abundance of village debris argue for an occupancy of some permanence and duration. Hunting was important; but the presence of numerous large cache pits, of innumerable bone hoe fragments, and finally of well-formed ears of 10-, 12-, and 14-rowed corn indicate a rather advanced and intensively pursued horticulture. In many particulars, the material culture remains at these sites parallel those from protohistoric Pawnee sites of the Lower Loup focus; and from one site come portions of a cloistered rim vessel (Udden, 1900, Fig. 10) that unquestionably must mean direct stimulus from, or intercourse with (Wedel, 1935, p. 245), the Lower Loup peoples.

At two sites in central Kansas and at others near the Oklahoma state line, glaze-paint sherds have been dug up; more have been collected by non-professionals from the surface of a number of other culturally similar stations. All pieces recovered by the National Museum party have been identified (Wedel, 1942) by Mera and Kidder as late Rio Grande forms, dating from *ca.* 1525–1650. Interestingly enough, the surface finds of Puebloan sherds in central Kansas suggest a somewhat longer period of contact with Southwestern peoples. They include some that "were in style for a short time during the last

half of the fifteenth century" in the Rio Grande Valley; and in the Grouse Creek Valley east of Arkansas City have been found fragments identified by Mera (letter of May 8, 1946) as Pojoaque Polychrome, an early eighteenth century ware. In all cases, these Puebloan wares occurred in sites or in sherd areas attributable to the local protohistoric Plains horizon under discussion. Objects of European origin have been recovered in very small quantities; they include bits of chain mail from two sites, a few glass beads, and an iron ax blade that appears to be of sixteenth and early seventeenth century Spanish form. This contact material, of course, strongly suggests an occupancy later than the Antelope Creek focus, a suggestion borne out by the inclusive presence of Rio Grande Glaze IV sherds. In the light of historic evidence summarized elsewhere, I believe it is not unreasonable to suggest that these sites belong to the Coronado and Oñate period. It should be noted that engraved sherds from the Red River area have been found at one site; also, that a very small but seemingly consistent proportion of cord-roughened sherds occurs in northerly sites of this horizon, possibly representing a carry-over from the earlier Upper Republican occupancy or perhaps early contacts with late Antelope Creek focus sites. For these "Quiviran" or "Paint Creek culture" sites I now suggest the designation "Great Bend aspect."

Over a considerable portion of the erstwhile Upper Republican habitat in western Nebraska and Kansas, still another complex was dominant in early post-Caucasian times. As yet, our information on this—the Dismal River culture—is not very comprehensive. Surface surveys have given some idea as to its geographical range, and a glimpse into its character is afforded by excavations in Chase County, Nebraska (Hill and Metcalf, 1942), and Scott County, Kansas (Wedel, 1940a, and unpublished data). Again a semi-sedentary mode of life is indicated, based primarily on hunting and secondarily on a maize-bean(?)-squash horticulture. The house type remains conjectural, but substantial earth-covered pithouses comparable to those of the Upper Republican are evidently absent. Puebloan contacts are evidenced by the presence of turquoise and tubular incised pottery pipes. In part, as shown by ruined stone multi-roomed dwellings and irrigation works at the Scott County, Kansas, site, these contacts must have been in the nature of an actual incursion of Puebloan bands fleeing Spanish oppression in the upper Rio Grande Valley. Several such movements into the Bison Plains in the late seventeenth and early eighteenth centuries are matters of record (Thomas, 1935). Glass beads and iron occur in very limited amount in these sites.

With regard to chronology, there are interesting clues. The incised pottery pipe fragments from the Scott County, Kansas, site have been identified by Mera (letter to Wedel, Aug. 9, 1945) as of late Rio Grande style. From a group of nearby cache pits, normally submerged by an artificial lake, came a sherd of Tewa Polychrome ware. The sherd was not found within a pit, but the pipe fragments which were unquestionably in association with Dismal River materials "correlate nicely with the sherd in age." Mera gives the time range for Tewa Polychrome as "from about the last two decades of the 17th up to the early years of the 18th centuries." Curiously enough, on dendrochronological evidence, Weakly (Hill and Metcalf, 1942, p. 205) has suggested dates of 1706 and 1709 for two Dismal River sites in Chase County, Nebraska.

Of actual contact between Upper Republican and Dismal River peoples there is no evidence, and the material culture inventories differ rather widely. A very few shell-tempered "Quiviran" sherds in the Scott County site suggest a slight degree of direct intercourse and partial contemporaneity between Dismal River and Great Bend peoples, but for the most part they seem to have reached their respective peaks at different times. It has been suggested tentatively that the occupants of the Dismal River sites may have been the Padouca, in turn variously identified as Comanche or Apache. From Spanish records (Thomas, 1935) it appears that various Apache bands were scattered over the High Plains north and northeast of the upper Rio Grande during the seventeenth and early eighteenth centuries, and it was from some of these that Archuleta and Ulibarri at various times "rescued" Puebloan fugitives. The Comanche, on the other hand, arrived in the region about 1700; by 1750, their incessant raids had driven the semi-sedentary Apache peoples southward nearer the Pueblos and to such security as the Spanish were able to offer. Thus, on historical evidence it appears that by the mid-eighteenth century, semi-horticultural pottery-making peoples no longer found the High Plains north of the Arkansas a

safe habitat; and this accords nicely with archaeological findings. A beginning date for the Dismal River occupancy is conjectural, but the sites now known probably fall in the period from *ca.* 1600 or 1650 to 1725 or 1750. This dating, contemporaneous with Glaze V and VI on the Rio Grande, seems to rule out the likelihood of any material contribution by Dismal River peoples to the development of Navaho culture. That the two complexes may have participated in an earlier common substratum, however, remains possible.

The foregoing correlations suggest that along a wide front in the western and southern Plains cross-dating of Plains with Southwestern cultures is possible. That front extends from southwestern Nebraska through Kansas and, as Krieger (1946) has shown, into northeast Texas. One large gap still remains in central Oklahoma. To what extent valid correlations can be made yet farther north and east, in and beyond the Kansas-Nebraska region, is an open question. It is hardly necessary to point out that the farther our correlations are carried the more suspect do they become. Their reliability, that is, tends to vary inversely as the directness of their relationship to the referrent datum—in this case, the Rio Grande time scale. Still, the temptation is great, and it may be interesting to see where the attempt leads us.

For the Pawnee, as already stated, historical records precise enough to permit site identifications carry us back to *ca.* 1775 or 1800. Older sites that for historical reasons can hardly be anything but Pawnee (Wedel, 1938) are plentiful, but these have not yet been convincingly arranged in chronological sequence. In the absence of a detailed statistical demonstration, I suggest that those Lower Loup focus sites that show the highest development of native arts and industries, the least amount of European trade goods, and no evidence of the horse complex are the oldest. For two of these, the Burkett and Gray sites, Strong (1935, p. 62) has proposed "an approximate median dating of 1600 . . . ." This estimate would make the sites roughly coeval with the Great Bend aspect of central Kansas, and such contemporaneity is also indicated by a close similarity in many stone and bone artifact types, and in certain pottery techniques. Finally, the cloistered rim vessel already mentioned from a Great Bend aspect site is virtually identical with the better grade wares produced at the Burkett and Gray sites. I see no good reason to doubt therefore that the earliest Lower Loup sites were flourishing at about the same period, i.e., *ca.* 1600 ($\pm$50 years), as the Great Bend aspect villages; they may well represent the settlements of Harahey reported, but not visited, by Coronado.

Southeast of the Pawnee, history gives us a somewhat earlier date line among the Kansa (Wedel, 1946). The oldest known site attributable to this tribe lies on the Missouri River bank at Doniphan, Kansas. Unhappily for the archaeologist, the greater part of this location has been destroyed by the present town. The French credit this Kansa town with 150 houses in 1723, and visited it the next year (Margry, 1886, pp. 392, 398 seq.). Archaeology shows that before its abandonment, trade goods were coming in in some quantity. There is no reason to suppose the village was newly established in 1724, and it may well have been the main seat of the Kansa at least as early as 1700. It is interesting to note, therefore, that the meager pottery and other aboriginal items found here do not show a marked similarity to the Oneota remains at the Fanning site, a scant fifteen miles to the north. Whereas the Kansa at the Doniphan site appear to have possessed an impoverished and decadent material culture and very little pottery, the Oneota people at Fanning still had a fairly extensive inventory of native artifacts and an abundance of pottery. That the two peoples were contemporaneous seems very doubtful, though it is evident that the Fanning Oneota were also receiving European trade goods in small amount. It would appear that this group occupied its site not later than 1700. And, interestingly enough, from several cache pits at Fanning were taken grit-tempered sherds markedly unlike the local shell-tempered ware, and virtually indistinguishable from certain Lower Loup focus pottery. In short, since Lower Loup focus sherds have been found inclusive in both Great Bend aspect sites in central Kansas and in the Fanning site in northeastern Kansas, a rough contemporaneity for the three horizons concerned seems indicated.

It can be argued, of course, that since the time span of none of the three horizons is known, we cannot be sure just where, or by how much, any two of them overlap. Of the three, the Oneota is very likely the latest, except insofar as the Lower Loup eventually developed into historic Pawnee. But a reasonable antiquity for Oneota peoples in the trans-

Missouri region must still be granted, for the Leary site, less than fifteen miles north of Fanning, shows a much more vigorous native culture and no evidence whatever of European contact (Hill and Wedel, 1936). Nor, unhappily for our problem, has it yet revealed evidence of intercourse with Lower Loup manifestations. To assign a date in the Christian chronology to this site is hazardous, but I can see no reason for viewing it as later than the mid-seventeenth century. The trans-Missouri Oneota remains, so far as I can see, offer no great hope for those who would have this complex a post-1650 development.

Earlier yet than any of the Oneota remains in this region are certain Middle Mississippi (Wedel, 1943, pp. 62, 188) and the Nebraska culture manifestations (Strong, 1935; Bell and Gilmore, 1936; Hill and Cooper, 1937, 1938). Nowhere have any of these sites shown evidence of European contact, though an occasional pot with Oneota-like decoration suggests that there may have been no actual or prolonged break between the late Nebraska culture and early Oneota occupations. That the Nebraska culture was in part contemporaneous with Upper Republican is generally accepted. Unhappily, neither the numerous Upper Republican nor the Nebraska culture sites have been amenable to arrangement in a temporal sequence, so we cannot say at what point or over what period of time the two were contemporaneous. About all that we can say at the moment is that some, at least, of the Nebraska culture sites were synchronous with part of the Upper Republican occupancy, and that very few, if any, of them appear to have been occupied as late as the developed Oneota sites of the region. This would mean that the Nebraska culture sites probably fall between the late thirteenth and the late sixteenth centuries, i.e., between *ca.* 1300 and *ca.* 1600. I would suppose further that the main Nebraska culture occupancy falls perhaps somewhat nearer the suggested terminal than the beginning date, and that Middle Mississippi influences were coming into the Nebraska culture when the Upper Republican peoples were already on the decline. It should be noted, however, that there is at present no indication of intercourse between Lower Loup focus peoples and the Nebraska culture; and since the Lower Loup focus, like the local Oneota, roughly equates in time with the sixteenth century "Quiviran" occupation of central Kansas, it would not be surprising if the Nebraska culture and the contemporary Middle Mississippi peoples had left the area or at least lost their distinctive character even before the middle of the fifteenth century.

I shall resist the temptation to carry our correlations yet farther northward, into the upper Missouri region. At the moment, I am doubtful that we can go much beyond Strong's synthesis (1940). When the pre-war researches in that area have been published in full, and supplemented with further intensive excavations, the attempt may be made with the promise of exceedingly worth-while results.

For the pre-Upper Republican occupancy of the Central Plains by pottery-making groups, the leads to exact chronology are still tenuous and indecisive. Woodland remains have been identified *in situ* as far west as Lane County, Kansas and Garden County, Nebraska; and in both instances they occur stratigraphically below Upper Republican deposits. Here, however, we have as yet no evidence of Puebloan or other Southwestern contacts, unless the curious resemblance between certain Plains Woodland pottery forms and those of the Gallina phase in New Mexico be so regarded. If there were trade or other contacts between pottery-making and/or horticultural Southwestern and Central Plains peoples in Upper Republican or earlier times, the evidence for it has not yet come to light. All that can be said is that the Woodland occupancy clearly preceded the Upper Republican, and that it seems to have been contemporaneous with a Hopewellian occupancy in eastern Kansas. If the estimate elsewhere given for the Upper Republican, at *ca.* 1250 to 1450 or 1500, is substantially correct, the Woodland-Hopewellian peoples were presumably present before 1200. How much before, and how long they may have roamed this region, I shall not venture to guess, though I regard the rather late placement of Woodland and Hopewellian on the accompanying chart as on the conservative side.

As visualized here, then, the chronology of pottery-bearing cultures in the Central Plains can be blocked out tentatively as in the accompanying chart (Fig. 51). The Antelope Creek focus equates roughly with Late Black-on-White and Glaze I and II periods on the Rio Grande, or *ca.* 1300–1475. The Upper Republican period was approximately coexistent, though it may have been of longer duration and very likely antedates in part the Antelope Creek horizon. Farther east, the Nebraska cul-

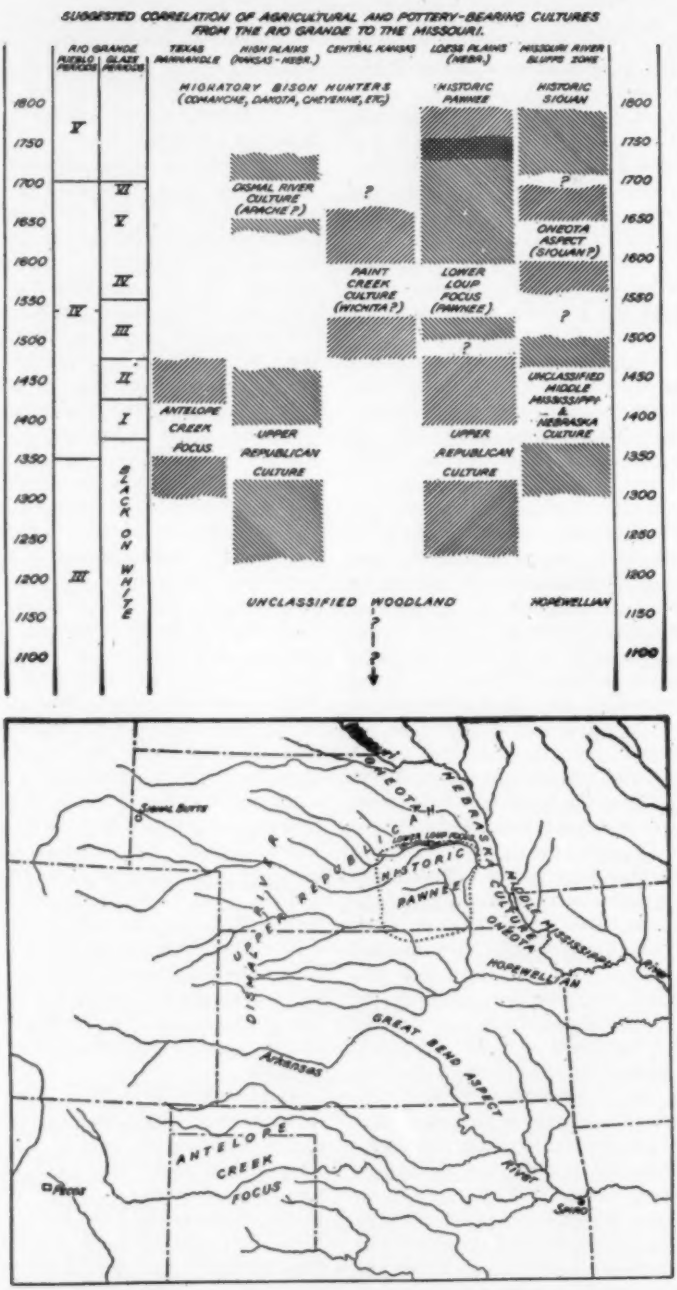

FIG. 51. Geographical and suggested chronological position of the principal known agricultural and pottery-bearing cultures in the Central Great Plains. "Paint Creek Culture" in the chart should read "Great Bend Aspect," as on the map.

ture and local Middle Mississippi manifestations were contemporary with Upper Republican, at least in part, and probably date not later than the mid-sixteenth century.[2] The Woodland-Hopewellian horizon, by reason of its stratigraphic position below Upper Republican, should equate with, unless perchance it precedes, the pre-Glaze Pueblo III period of the Southwest.

By 1550, the Upper Republican peoples had long since abandoned the western Plains and also their identifying material culture. In central Kansas, the peoples of the Great Bend aspect were firmly established by Coronado's time, were trading with Rio Grande pueblos of the Glaze IV period, with the Lower Loup villages of east central Nebraska, and with peoples making carelessly engraved pottery to the southeast. Farther east, by this time or not long after, Oneota groups had established themselves. By Glaze VI times, approaching 1700, the Great Bend aspect was on the decline or was shifting its locus southward, the material culture of the Lower Loup focus was declining, and the Dismal River culture was flourishing in the High Plains of western Kansas and Nebraska. The Oneota sites in northeastern Kansas and on the Nemaha had been abandoned, and the Kansa held the district. By 1750, the Dismal River culture had passed away, the Great Bend aspect peoples had wholly abandoned the central Kansas region and Lower Loup culture was presumably acquiring the forms we now recognize as historic Pawnee. By 1800, the Comanche, Dakota, Cheyenne, and other migratory bison-hunters roamed most of the Central Plains, with the old semi-horticultural mode of life adhered to in half-hearted fashion by the Pawnee, Kansa, and other tribes along the eastern margin of the Plains.

[2] A recently published outline of the archaeology of the Spiro locality in eastern Oklahoma (Orr, 1946) offers interesting leads toward correlation with Central Plains chronology. Certain vessel forms and other pottery traits, pipe types, various chipped stone implements, socketed scapula hoes, and perhaps other materials described from the latest horizon at Spiro, the Fort Coffee focus, point rather strongly toward relationships with the protohistoric Great Bend aspect sites of central Kansas; and since there are no horse bones or trappings, or other evidences of European contact, I would suspect that the Fort Coffee remains are much closer to *ca.* 1600 than to *ca.* 1700. The Middle Spiro component, with its rectangular four center post houses and Southern Cult remains, would be still earlier, equating with Upper Republican and antedating, perhaps by some little time, the beginning of the sixteenth century (cf. Krieger, 1945, p. 509). Unfortunately, direct cross-dating of Spiro with the Rio Grande pueblos has not been possible.

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United States National Museum
Washington, D. C.

NOTES ON SOME CERAMIC TECHNIQUES AND INTRUSIONS IN CENTRAL MEXICO

JAMES B. GRIFFIN and ALEX D. KRIEGER

IN THIS paper we wish to point out (1) certain occurrences of cord-marked and stamped pottery in Mexico which possibly bear relationship to similar decorative techniques in the eastern United States, and (2) a few instances of trade pottery in central Mexico which point to an origin in more northerly cultures. Neither author pretends to be intimately acquainted with ceramic problems in Middle America, and this account is incompletely documented. We are, however, quite sure that the material to be presented will prove important in any consideration of pre-Columbian contacts between the eastern United States and Middle America. It appears surprising that the decorative techniques in question have not received more attention, and it is suggested that a sharper lookout be maintained for similar material, particularly in central Mexico. As yet, no particular conclusions can be drawn as to the meaning of the similarities cited.

CORD-MARKING

Pottery which bears surface modification produced by the impression of cord-wrapped paddles, woven fabrics, or baskets, is of enormous distribution in the eastern United States, reaching to northern Florida and the central Gulf Coast, and far into the Great Plains. It is an intimate and constant feature of the Wood-

land culture pattern, and throughout much of its distribution in eastern North America it is the oldest known pottery. From western Alaska a pottery has been reported which bears textile impressions on the inner surface, probably representing twined basketry.[1] Cord-marked or textile-marked pottery is also of very great distribution in northeastern Asia, and as it is of considerable time depth there and strikingly similar to Woodland pottery, there is growing agreement that Woodland pottery owes its origin to an introduction from Asia.[2]

Considering the prevailing theory of a north-to-south settling of the New World by peoples of Asiatic origin, together with the postulated source of Woodland pottery in northeastern Asia, it is of considerable interest to note that cord-marked ware is also found in the Valley of Mexico—perhaps also in other parts of Mexico. This is the more significant since it is commonly believed that Woodland pottery and its derivatives on the one hand, and the various potteries of Middle America, the southwestern and southeastern United States, etc., represent two great, distinct, and possibly quite unrelated ceramic traditions. This is not to say, of course, that the presence of cord- or fabric-marked ware in the Valley of Mexico can be expected to explain the origin of Middle American pottery. The problem is too vastly complex and this too slight a clue; furthermore, it may have come about independently of any influence from lands to the north of Mexico. We shall consider the matter again in connection with the stamping technique.

William H. Holmes, in a little-known paper read before the Anthropological Society of Washington in 1884, suggested that the aboriginal arts of Mexico were largely developed within the borders of that country.[3] He believed that its history could be read in the type of deposit observed by him near the Central Railway Station in Mexico City. In an excavation made for a house or ditch, Holmes noted three distinct ceramic groups from the bottom to the top of a section eight feet in depth.

The prevailing type of ware, throughout the lower part of the section, is very archaic and is to all appearances quite distinct from the handsome pottery characteristic of the upper half of the section.

It was simple in form and rude in finish and little superior in any respect to the rudest products of the wild Indians of North America. At the base the fragments are small and much decayed; higher they are larger and better preserved, although I was unable to secure a complete, unbroken vessel.

The only form that came to my notice, although thousands of pieces were examined, is a kind of deep cup or bowl, not unlike our common flower pot, and having a flattish bottom and an extremly uneven and ragged rim. In all cases the exterior surface is covered with impressions of coarse woven fabrics, the single indication of advance toward better finish being a slight polishing of the interior surface, which was accomplished with a smooth implement, such as a pebble or shell. Where well preserved, the paste is generally hard and fine grained, but shows in all cases a rather rough granular fracture. The character of the tempering material cannot be made out, but, in a number of cases, the texture indicates the former presence of fibrous particles like finely pulverized grass, leaves, or straw. The surface is of a pale, yellowish red or terra cotta color, the result of baking, while the interior of the mass is generally a dark gray.

In fig. 2, I present an example of this pottery which is restored from fragments. These did not come from the wall of the section, but from a pit, a short distance away, where the pieces were larger and better preserved. In this example the rim is thick and slightly enlarged as if squeezed over the edge of a basket used as a mold. In most cases no attempt has been made to render the edge even or smooth, and the finger marks and the irregular partings of the margin, which came from squeezing the clay into or over molds and expanding the edges to secure greater size, are all visible.

It is difficult to find a well preserved and clearly defined impression of the fabric employed in the manufacture of these vessels. The clay was probably not of a character to take a clear impression and the cloth was apparently of a ragged, irregular kind. The mesh was open and the thread coarse and slightly twisted. The finer specimens show about eight intersections to the inch and the coarser probably six. In some cases one series of threads seem to have been large and the other small. These fabrics were applied to the entire exterior surface of the vessel, but not with much regularity. They may have served to facilitate the handling of the ware while in a plastic state.

This pottery is distributed in horizontal layers throughout a vertical series more than six feet in thickness, and represents an early epoch of the art of Anahuac.

In the upper portion of the lower group of beds we encounter two other varieties of ware. These may have been developed from the rude form in the natural course of progress but there are few indications of this growth here.

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[1] Giddings, 1944, pp. 126, 131–32. From the same site Giddings also reports "consistent use" of stamped pottery designs, applied with paddle. Paddle-stamped decoration is here treated in a separate section (see below).

[2] For an hypothesis to this effect, see McKern, 1937. It should be mentioned that some Woodland pottery is plain rather than cord- or fabric-marked; however, we are only concerned with the latter here.

[3] Holmes, 1885.

They are much more nearly allied to the later than to the earlier stages of art of the section. The transition is very abrupt.

The authors were able to examine this pottery in the files of the United States National Museum, and a photograph of seven typical sherds (Pl. XI) was kindly furnished by Dr. Alexander Wetmore, Secretary. Impressions of woven material are clearly seen on these examples, and two (A, G) show the widened, squeezed-out rim (i.e., lip) mentioned by Holmes.

From the final paragraph quoted above, it would appear that this ware occupied a rather early position in the ceramic sequence of this region, and no transitional stages linking it with the later Aztec wares could be discerned by Holmes. Since Holmes presented an account of remarkable clarity over sixty years ago, it is puzzling that there seem to be almost no other published records of this ware. Tozzer, in classifying the ceramics of the Valley of Mexico, refers to what is almost certainly the same kind of pottery as "Type IV."[4]

Type IV, Textile marked. This type (Fig. 7) is found only in small sherds. The shapes of the pieces could not be determined. The texture is very coarse. It is sometimes difficult to distinguish this from what has been called the "Cuneiform type." This class of pottery is well represented here, and it is also found at Ticoman and other sites which date back to the Archaic period. It is not uncommon in some Aztec sites. It is therefore impossible to limit its manufacture to a single culture.

In answer to a query, Vaillant replied that he believed Holmes was referring to "Aztec salt pans" and intimated that they are common in the Valley of Mexico. However, the shape of the sherds now in the United States National Museum does not support the idea that Holmes was referring to salt pans; Holmes' statements also indicate that this material fell into a pre-Aztec horizon. On the other hand, it is doubtful that cord- and fabric-marked pottery belonged to Archaic cultures, for Vaillant does not mention it in his several reports on "Middle Culture" sites. Tozzer (see above) says it is also found at Ticoman, but the fuller excavations at this site by Vaillant should have revealed such ware if this were true. Is it possible that the second half of the above quotation refers not to "textile-marked" pottery, but to the "Cuneiform type" which *is* common in Archaic sites?

At Cuicuilco, which he called a late Archaic site, Kroeber described one sherd from Excavation D which "seemed fabric-impressed on the inside."[5]

Ekholm, in response to a query on the same problem, stated that he knew little about the occurrence of impressed pottery in Mexico and was not familiar with "Aztec salt pans." In his recent work on the Tampico area, however, Ekholm found several sherds of "Textile Marked Ware," probably from one vessel, in the earliest levels (I–II) of the Pavón site.[6]

The authors, while attending the Third Round Table Conference in Mexico City in 1943, superficially examined a number of collections from important sites in central Mexico, and failed to note any such cord- or fabric-marked pottery. Several Mexican authorities professed ignorance of this pottery treatment, but this may have been due to our inability to describe properly what was meant.

In view of this situation, it is most interesting to note certain sherds in the collection of Mr. Jack T. Hughes, a former student at the University of Texas. While attending the National University of Mexico in 1942, Mr. Hughes made small surface collections in various parts of southern Mexico, from Vera Cruz to Cuernavaca and Oaxaca. These are now deposited at the University of Texas. Mr. Hughes made no attempt to collect any particular kinds of pottery, merely picking up a few surface specimens at random. There were eight sherds of fabric-marked pottery in five of these collections, from in and near the Valley of Mexico. They are shown in Plate XI and labeled as follows in Mr. Hughes' notes:

Pl. XI, N–P. "A small site by the Pan-American Highway just north of Mexico City" (not, however, the Ticoman site, from which he also collected). The three sherds belong to one vessel.
P. XI, I, M. "Pyramid of Tenayuca north of Mexico City."
Pl. XI, L. "Islas de Xochimilco in Federal District."
Pl. XI, J. "Tula, the Toltec capital about 50 miles north of Mexico City."
Pl. XI, K. "Huexotla, near the town of Texcoco."

All these sherds agree precisely with Holmes' description of the fabric-impressed pottery

[4] Tozzer, 1921, pp. 48–9.

[5] Kroeber, 1925, p. 402.

[6] Ekholm, 1944, p. 346 and Table 1.

from the Central Railway Station, and with Tozzer's "Type IV," given above. The rim sherds shown in Plate XI, N, P, from the site beside the Pan-American Highway, have the rude, twisted appearance mentioned by Holmes, as though the pottery had been molded in a closely woven (twined ?) basket and then been pushed out slightly over the basket's lip. All the Hughes sherds have a twisted, lumpy paste which, to judge from its strongly creased structure and elongated cavities, must have been tempered with vegetal material; or, if not added deliberately as temper, a grassy substance was at least present in the clay. As the creases tend to run in vertical planes, it appears that the pottery was not coiled. The two sherds from Tenayuca pyramid are notably less gnarled than the others, and their interior surfaces also differ in being better smoothed; neither does their paste appear to have contained as much grass or fiber as the remaining sherds. These differences possibly have some temporal significance, the Tenayuca sherds perhaps representing a later and better developed ware than the others. This matter of course requires checking by Mexican experts. The Tenayuca site reveals pre-Aztec as well as Aztec occupation.[7]

The three Hughes sherds from a site by the Pan-American Highway are a pinkish red color on both surfaces, and the core a slaty gray with pinkish tinge. There are abundant small, rounded white particles besides the cavities left by burned-out fibers, both of which may be seen in Plate XI, O. The paste appears to be a fine sand or silt of volcanic origin and gives off a high metallic ring. These characters make it appear most likely that the pottery is indigenous to the Mexican Highlands rather than a trade ware from the eastern United States. In other respects, such as the close weave of the fabrics pressed into the plastic clay, the apparent over-all application of impressions to the whole vessel exterior and rim, the rough, gnarled, and molded appearance of the paste and the inclusion of fibrous material, the Mexican sherds seem typologically close to some Woodland pottery.

Within the vast Middle American culture zone, this rude, fabric-impressed pottery, which seems to have been molded in baskets of twined weave, provides a very strong contrast with the more common coiled, polished, plain, incised, and painted wares. As yet, however, little can be said of its chronological position. From the brief notes we have given, the impression is gained that it belongs with relatively early or intermediate Mexican cultures, possibly falling more or less into the so-called "Chichimec" horizon rather than Aztecan. Should this prove true, a correlation with Woodland culture in late pre-Mississippian times in the eastern United States may be forthcoming. At present, the more southerly occurrences of cord- and fabric-impressed pottery in the United States can be fairly well dated; in these cases the pottery so treated may not be Woodland, but is undoubtedly Woodland derived. In the Texas Panhandle, a cord-marked pottery of this nature, tempered with crushed rock, bone, or clay grit (or combinations thereof) was made from about 1300 to 1450 A.D., as found by association with datable Puebloan trade pottery.[8] Cord-marked pottery also occurs in the lower Mississippi Valley, probably as early as during the Marksville period, if not earlier; in this case it almost certainly dates before 1000 A.D.[9] With more data, there is ample reason to hope for a close temporal correlation between the cord-marked pottery of the eastern United States and the Valley of Mexico. Bennett's recent statement on the lack of cord-marked pottery in Middle America should probably be revised.[10]

It should be evident that this particular problem is of quite a different nature from that of possible Middle American influences on "Middle Mississippi" cultures of the eastern United States; it may, however, prove to have

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[7] Vaillant (1940, p. 6) states that "At Tenayuca six temples were found superimposed, the upper two of typical Aztec architecture. Excavations nearby revealed three layers of pottery, the upper of Aztec date, the second probably to be correlated with the Tepanec-Acolhua people, and the crude styles of the lowest layer assignable perhaps to the Chichimec." A detailed study of Tenayuca ceramics (Noguera, 1935) reveals no mention of this ware.

[8] Krieger, 1946.

[9] *Idem.* The discussions in this work deal with datings of culture complexes in the southern Plains and the "Caddo area," the latter involving early and late horizons of the Mississippi pattern. Correlations with the Louisiana culture periods suggest that recent estimates have been placed somewhat too late, and that the Marksville period could hardly have existed later than 1000 A.D. This would push the terminal dates suggested by Ford and Willey (1941, Figs. 2, 6) back some 200 years.

[10] Bennett, 1944, p. 37.

some bearing on the time of contacts between these regions.

STAMPING

There are many different decorative techniques in native American pottery which may be termed "stamping." Here, we are chiefly concerned with the method of impressing designs into the plastic clay with a carved object of wood or clay. This technique is also of very great distribution in the New World, sometimes coinciding with cord-marked or fabric-impressed surfaces, but in other cases not. In northwestern Alaska, Giddings[11] has described a pottery with curvilinear stamped designs applied with a carved wooden paddle. The same site, Ahteut, also produced a ware with textile (twined basketry ?) impressions on the inner surface of bowls. Paddle-stamped designs are said to be present on the earliest known Eskimo pottery.[12]

In the eastern United States, Ford and Willey have discussed the appearance of stamped pottery decorations in Burial Mound I times:[13]

> From South Carolina along the coast to north Florida, linear check, bold check, and simple stamped decorations on sand-tempered ware appeared in the late Archaic, contemporaneously or slightly before this time. . . . These styles mark what is known as the Deptford period. . . .
>
> A peculiar pottery decoration consisting of complicated designs, both curvilinear and rectilinear, carefully stamped on vessels appeared at the end of the Deptford period and replaced the Deptford decoration styles in the southeastern states. This type, or group of types, is considered to mark the Swift Creek horizon and its inception was probably about 1000 A.D., essentially coeval with that of the beginning of Burial Mound II, or Marksville, in Louisiana. This decoration complex spread inland to a greater extent than the Deptford, covering most of Georgia, north Florida, northern Alabama, and parts of Tennessee. Along the Tennessee River, like most of its accompanying types, it was limestone tempered.

Bennett has also written of the Swift Creek stamped pottery:[14]

> . . . In addition to the Adena-Hopewellian-Marksville cultures of this period [Bennett's "Period III"] there existed a deep-Southeastern horizon known as Swift Creek. This culture shows many Hopewellian features, but in addition contained some elements that constitute a separate problem. Swift Creek pottery, for example, *is distinguished from all other Southeastern pottery of Period III by being decorated with a complicated stamp* [italics ours]. The figure-8 design of this stamp, although displaying some similarity to Hopewellian incised motifs, may also find an analog in the pottery stamps used for marking textiles in the Maya region. Up to this time there had been no clear antecedent to the complicated stamp—save the simple unitary stamps of Period II—yet the technique seems to appear in Swift Creek as a fully-developed form. The *technique* of stamping is early in the Southeast, but the complicated *design* has no definite precursor.

Turning to Middle and South America, the use of stamps for decorating pottery (as well as textiles) was employed in southern Mexico, the Maya region, and Peru. As in the southeastern United States, a distinction should be made between unitary stamped elements spaced around a vessel, and more or less complete coverage of the vessel exterior. Tozzer included both treatments in his "Type VI, Stamped," but the difference is clear in his Figure 8, A compared with Figure 8, B–C.[15] He states:

> The pieces decorated by stamps are usually bowls. The stamps offer a large variety of very beautiful designs. A common form is that of the twisted rope. Other designs are frets and rosettes.

[11] Giddings, 1944, p. 126 and Pl. XII, C, D.

[12] Collins, 1937, p. 168 and Pl. 52; Rainey, 1941, p. 550. De Laguna (1939, p. 340) considers stamped pottery as belonging principally to the Birnirk period of Eskimo culture.

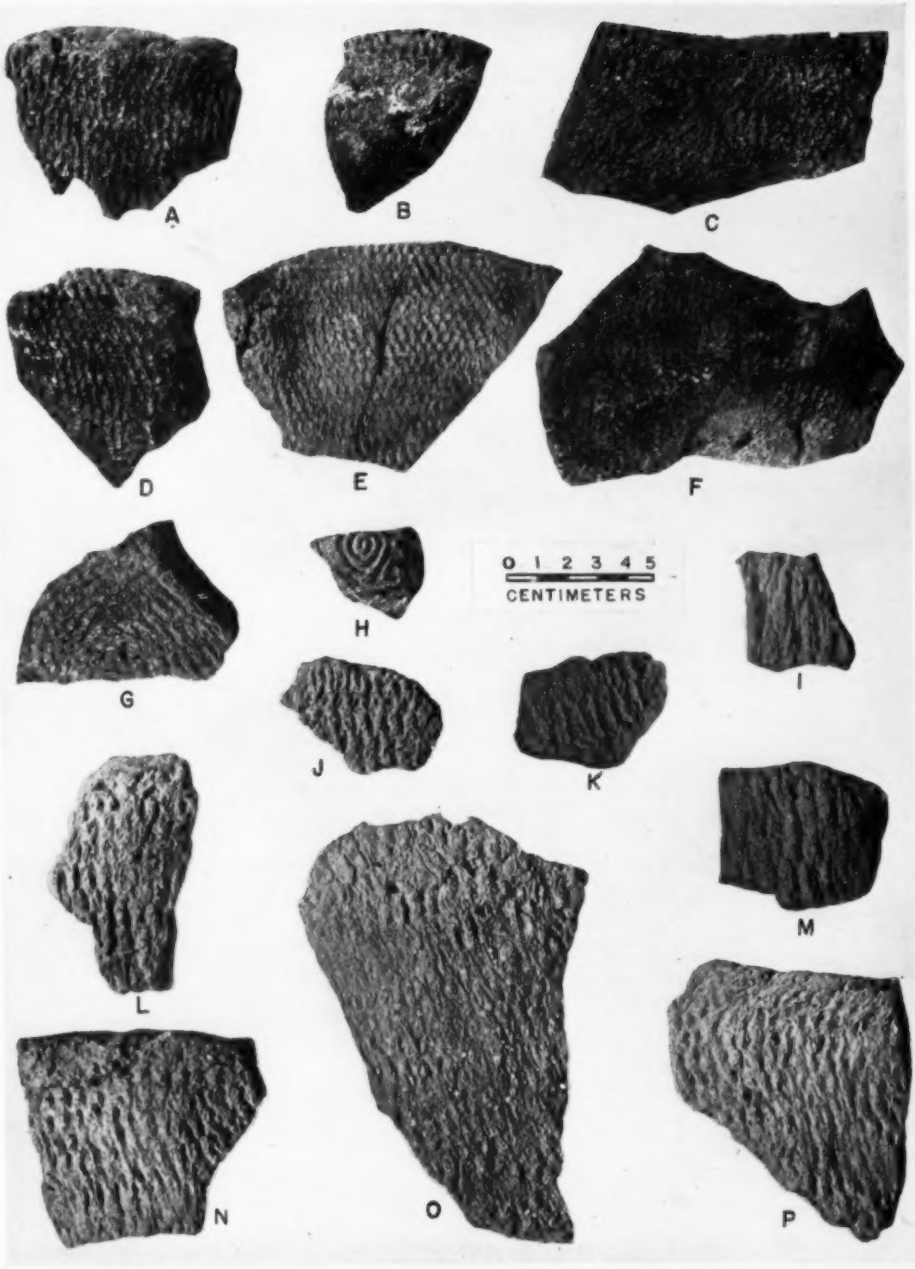
[13] Ford and Willey, 1941, pp. 339–40.

[14] Bennett, 1944, p. 36.

[15] Tozzer, 1921.

PLATE XI

A–G, collected by Holmes from a ditch or excavation near the Central Railway station, Federal District; H, by Batres at San Juan Teotihuacan; I–P, by Hughes; I, M, at Tenayuca; J, at Tula, state of Jidalgo; K, at Huexotla; L, at Islas de Xochimilco; N–P, at site by Pan-American Highway just north of Mexico City. Note regular weave impressed on A, D, E; irregular weave or cord-wrapped paddle (?), on B, C, G, I, K, M. H is apparently paddle-stamped, and the regular impressions of J, L, N–P suggest twined basketry. The long, vertical cavities left by burned-out fibers, and white, granular particles of temper (?) appear in O. A, D, G, L, N, and P are rim sherds. A–H are in the United States National Museum; photo furnished by Dr. Alexander Wetmore, Secretary. I–P are from the Jack T. Hughes collection, 1942.



Stamped and fabric impressed pottery from the highlands of Mexico. (See facing page for identifications.)

Stamped, molded, and trade pottery from Mexico. (See facing page for identifications.)

The "twisted rope" motif shown by Tozzer may be compared with some "complicated stamp" designs in the southeastern United States, such as the "figure-8" design mentioned by Bennett. On the other hand, those made with small individual stampings in Mexico are quite unlike any known designs in the United States, for they commonly represent frets, rosettes, animals, birds, serpents, etc.

The excavations of Linné at San Juan Teotihuacan in the Valley of Mexico revealed pottery with stamped decoration in a horizontal band and in spaced units around the vessel-rim exterior. The clay stamps themselves were also found, those whose provenience could be determined belonging to a late period (Mazapan).[16] A stamped sherd found by Batres at Teotihuacan, now in the United States National Museum, is shown in Plate XI, H. Linné compiled data on the geographical distribution of the stamping technique, suggesting that it was closely related to the making of designs by casting the vessel bottom in a mold. Clay stamps are, of course, extremely common in Aztecan remains in the Highlands, probably less so in the Mazapan horizon, but they seem not to have been reported from the Teotihuacan periods or in Archaic cultures.

Ekholm's excavations in the Huasteca area about Tampico yielded five pottery stamps from the Las Flores site, and are tentatively placed by him in Period V, "which can be fairly accurately equated with the Aztec I-Mazapan horizon."[17] In his Figure 9, A–H, Ekholm depicts sherds of Zaquil Black Incised, a Period IV type in which the designs suggest imitations of stamped units and bands.

At Tres Zapotes on the Mexican east coast, Weiant has reported stamped pottery, but his description seems to apply to vessels with molded bottoms rather than to decorations impressed with a stamp.

> The middle specimen of the third row [Pl. 63] is really a sherd of stamped pottery, rather than a seal. Being flat, it suggests the stamped bottom of an Aztec Period I vessel. . . . However, stamped pottery in this general style has a very wide distribution. The material from Mound 36, Copan, on exhibit at the Peabody Museum of Harvard University, includes sherds of stamped pottery exhibiting designs of precisely the same sort, although these appear in rectangular panels with rounded corners on the walls of the vessels instead of on the bottom. . . .[18]

It therefore appears that the Copan vessels bear impressions of stamps, whereas those mentioned from Tres Zapotes resulted from a molding technique which is of very wide distribution in Middle America.[19] On the other hand, Weiant illustrates a wide variety of clay stamps, both flat-faced and cylindrical, from this site.[20]

Drucker's report on the ceramics of Cerro de las Mesas, Veracruz, does not mention stamped pottery, but a "specialized bowl type" of the Brown Polychrome Ware is equipped with a "molded interior bottom." This ware occurred only in the Upper I zone, a distinct ceramic period in which polychromes were common.[21]

Stone illustrates a loop-handled jar from the Ulua region of northern Honduras with a "medallion" stamped on the shoulder. She

[16] Linné, 1934, p. 108.

[17] Ekholm, 1944, pp. 431, 472, Fig. 48, K–N.

[18] Weiant, 1943, p. 117.

[19] Lothrop (1933, p. 34 and Note 1) makes the following observations on molds: " . . . The use of molds for making and adorning pottery became known to the Maya before the downfall of the Old Empire, but at no period did they employ them extensively. . . . The invention of the mold probably took place in South America, together with the invention of smelting. Molds were very commonly employed by early Chimu potters at a period corresponding approximately to the Maya Old Empire." Mold-made pottery is unknown in the United States, so far as we are aware.

[20] Weiant, 1943, Pls. 62–3.

[21] Drucker, 1943, pp. 50, 71, Table 5, and Pl. 53, M–Q.

PLATE XII

A–I, collected by Jack T. Hughes in 1942: A, C, D, G, Los Reyes; B, E, F, H, Cerro de la Estrella (both in Federal District); I, Pyramid of Cempoala, Veracruz. A, B, D, E, are apparently paddle-stamped; F, G, probably seal-stamped (included for contrast); C, shows corner of stamped area at lower left, technique uncertain. I is molded bottom sherd included for contrast with stamped decorations. J is paddle-stamped sherd from San Augustine Acolman, the sixteenth century monastery near Teotihuacan; presented to the Ceramic Repository for the Eastern United States by the Department of Colonial Monuments, Mexico. H, probably Villa Ahumada Polychrome, a Chihuahuan culture type of the Babicora phase, found by Hughes at Cerro de la Estrella site. K, a corrugated body sherd, probably of Chihuahuan origin, reportedly found near Tampico, southern Tamaulipas, by R. L. Batts. All specimens except J are in collections of the University of Texas, Anthropology Department. A, C, F, H, J are rim sherds.

states that this "is a conventionalization suggestive of the Maya," and that "Stamped designs are comparatively rare in Middle America."[22] From northwestern Honduras, Strong, Kidder, and Paul illustrate sherds with molded, unit-stamped, and rocker-stamped decoration,[23] all of which appear to have been rare in comparison with the beautiful polychromes of Maya culture in this area. The rocker-stamped technique will be mentioned again below.

Many varieties of stamped decoration, as well as clay stamps, have been described by Kroeber and Muelle from Lambayeque, Peru.[24] In certain respects, Peruvian stamping is quite similar to that of the southeastern United States. It ranges from "simple stamp" through "check stamp" to zigzag and variations of the "complicated stamp." Furthermore, such designs were applied to the entire exterior of tall jar-shaped vessels as in the southeastern United States, although many other kinds of vessels were also so treated. Willey has written Griffin as follows:

> This material has been known for a long time but no one knows much about its time position. The distribution seems to be the northern part of the late Chimu range. Some authors have thought that it might be the source of the "pressed wares" which made themselves known all down the north and central coast during the middle periods (Epigonal and afterwards). If the Lambayeque and Piura country is the source of this technique, as far as Peru is concerned, it must belong at least in the middle period in the north. The earlier horizons north of Chicama are unknown, but there is nothing in any of the earlier periods from Chicama south that suggests the slightest proto-type of this technique.

Regarding any possible connection between Peru and the eastern United States in the use of stamping techniques, a letter from Griffin to Professor Kroeber brought this reply:

> It is such a long distance from our South to Peru, and there seems to be so complete an absence of paddled ware in this vast stretch, that I had assumed that it was a case of independent development. If anyone can demonstrate a connection, more power to him.

Without implying any direct historical connection over the tremendous distances between Peru and the eastern United States, we think it possible that certain common influences may have operated on the ceramic traditions of the eastern United States and Latin America from time to time. It is premature to attempt a postulation of the possible directions of such influences, if they did exist. We have, however, already shown that a stamping technique was by no means completely absent in the intervening regions, as it was employed in Maya and central Mexican cultures. Also, it is obvious that a more thorough search of archaeological collections and literature can be expected to reveal additional information on the problem. In Middle America particularly, unusual and obscure ceramic techniques have often been omitted from the reports, illustrations being concentrated instead on the more spectacular painted and modeled wares.

A general distinction may be made in the means of applying stamped decorations in the areas so far discussed. In Alaska and the southeastern United States this was done almost exclusively with a wooden paddle on which the design was carved. In central Mexico, the Maya region, and Peru the stamps were quiet generally of hard-baked clay and are often found in perfect preservation. Latin American clay stamps were of two principal forms: (1) flat-faced and round or rectangular, with a projecting stem or handle at the back, and (2) cylinders which had the desired design modeled all the way around, and which were rolled against the still-plastic vessel. For some reason, the impressions of wooden paddles have a somewhat different cast from those made with clay stamps. Thus, while it is likely that Southeastern paddle stamping and Mexican seal stamping both owe their origin to a common principle of pressing pre-prepared designs into plastic clay, anyone familiar with the ceramics of these two regions can readily distinguish between the two techniques. There is an unmistakable difference in the depth, width, and spacing of the elements in paddle and seal work. It is also notable that stamped vessels of the southeastern United States are commonly jar-shaped and completely covered with the paddled designs, while in Mexico stamped vessels are usually bowls and bear the impressions in narrow horizontal bands or spaced units around the rim zone. Unitary stamps were used on Illinois and Ohio Valley Hopewellian pottery, but this method was apparently not common in the United States.

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[22] Stone, 1941, p. 79 and Fig. 90, A.

[23] Strong, Kidder, Paul, 1938, Pls. 4, Q–V, X–Z; 5, N; 9, C–D respectively.

[24] Kroeber and Muelle, 1942.

As in the case of fabric-impressed pottery discussed above, the authors have observed a few instances of pottery from Mexican sites which agree more closely in technique with common wares in the eastern United States than they do with the bulk of indigenous wares. Our suggestion that these examples are more similar to Southeastern paddle-applied "complicated stamp" than to Mexican seal stamping is not made with the intention of demonstrating their historical connection; the purpose is primarily to draw more attention to an interesting and potent problem.

A case in point is the large bowl sherd shown in Plate XII, J. This was found in the grounds of the sixteenth century monastery of San Augustin Acolman near San Juan Teotihuacan. Through the courtesy of the National Department of Colonial Monuments, Griffin has obtained this specimen for the Ceramic Repository at the University of Michigan. At the Third Round Table Conference of 1943 in Mexico City, this sherd excited considerable comment among the archaeologists present who were familiar with ceramics of the southeastern United States. The curvilinear motifs which cover the exterior except for a plain, polished zone 3.5 cm. wide at the rim, in cast and arrangement remind one instantly of Swift Creek complicated-stamp work, and are, on the other hand, quite un-Mexican. The stamping was almost certainly applied with a wooden paddle rather than clay seal in the typical Mexican manner. It is not, however, to be regarded as a trade piece, for the paste does not have the feel of stamped wares of the Southeast, being in agreement rather with indigenous pottery of the Mexican Highlands.

The authors attempted, without success, to discover whether examples of this mode of stamping have been found elsewhere in Mexico. Later, in Austin, Krieger examined the surface collections made by Jack T. Hughes in southern Mexico (see above). Interestingly, Hughes had found sherds comparable to the Acolman "complicated stamped" specimen at two other sites in the Valley of Mexico, but not elsewhere on the forty or more sites examined. These sherds are shown in Plate XII, A–E. They are from Los Reyes in the Federal District, and Cerro de la Estrella, which Kroeber has described as "the famous little peak in the center of the valley of Mexico on which new fire was made at the opening of each 52-year calendrical cycle."[25] Kroeber found three ceramic zones at the Cerro: zone 1, at the foot, "contains virtually no Aztec material" but Archaic pottery was plentiful; zone 2, "clearly Archaic"; and zone 3, at the summit, with "Aztec as well as Archaic sherds." The Hughes collection from this and the Los Reyes site contains some sherds comparable to the late Archaic Ticoman and Cuicuilco, but in each case the bulk of the collection is Aztec ware. In May, 1946, Griffin had examined these Mexican sites and wrote to Krieger as follows: "I found no stamped pieces in the Archaic parts of Cerro de la Estrella. The stamping belongs in the early Aztecan period." Until further evidence appears, the paddle-stamping technique on Mexican pottery would appear to date approximately from early Aztecan times.

Two of Hughes' Los Reyes sherds are almost certainly paddle-stamped (Pl. XII, A, D); a third may be, but the small stamped area at the lower left corner (Pl. XII, C) does not permit a determination. Two of the Cerro de la Estrella sherds are also probably paddle-stamped (Pl. XII, B, E). Seal-stamped sherds were also found by Hughes at these sites, and we have included one from each site (Pl. XII, F, G) for contrast. At the bottom of the plate (Pl. XII, I) a mold-decorated sherd from the Pyramid of Cempoala, Veracruz, has been included to show the difference in cast from both the presumably paddle-stamped and seal-stamped sherds. In general, there should be little difficulty in distinguishing the three techniques in Mexican pottery.

At the present time it is impossible to estimate how common the paddle-stamping technique was in the cultures of southern Mexico. To judge from the occurrences cited, namely Acolman, Los Reyes, and Cerro de la Estrella, it was quite uncommon and perhaps localized in the Valley of Mexico. However, a thorough study might reveal a more general separation of paddle and seal stamping, and thus extend our knowledge of paddle work in Middle America. As to temporal position, we can only guess that it falls in the Mixteca-Puebla culture horizon.

The present specimens do not appear to be trade sherds—at least not from the southeastern United States area. The paste seems not to differ notably from that of relatively late indigenous wares in the Highlands. Four sherds

[25] Kroeber, 1925, pp. 398–9.

(Pl. XII, A–D) are a cream to light brown color from the surfaces about 1 mm. inward, the core being a flat gray. The other (Pl. XII, E) is a light creamy brown throughout. The clay is rather fine in texture, compact, even, well-fired in all cases, and with one exception appears to be without added tempering material. The exception (Pl. XII, D from Los Reyes) seems definitely tempered with sand. In all cases the interior surface was scraped horizontally and well-smoothed to polished. The two rim sherds from Los Reyes (Pl. XII, A, C) have a plain zone about 4.0 cm. wide below the lip; this zone is polished and bears a wide red-painted band —further indication that they are not trade pieces from the southeastern United States. That the paddle-stamped design motifs themselves are very suggestive of Swift Creek complicated-stamped in the Southeast, rather than Mexican seal-stamped motifs, may be seen by comparing them with such pottery as that found by Moore in Duval County, Florida,[26] and elsewhere in that area.

Our tentative conclusion from the foregoing notes is that a technique of impressing designs with a wooden paddle in the manner typical of the Swift Creek period in Georgia and northern Florida, was in use during relatively late times in the Valley of Mexico, where it was applied to indigenous pottery. If its apparent rarity in Mexico when contrasted with the Southeast may be taken as an indicator of the direction of borrowing, Mexican potters were the borrowers in this case. However, this deduction may easily be altered with additional facts. As we have suggested, the paddle-stamping technique may also be found to have been used elsewhere in Middle America.

ROCKER-STAMPING

A technique possibly allied to that of pressure-stamping discussed above is that of rocker-stamping. This involves using a sharp-edged or tooth-edged implement, such as a bivalve shell or a carved cog of bone or wood, and rotating it back and forth in the clay so as to produce patterns of the zigzag lines that result. In the United States this technique is one of the outstanding features of pottery decoration in the Marksville and Hopewellian cultures. We will not attempt to discuss it here beyond mentioning certain Middle and South American occurrences which provide a supplement to the fabric-marking and stamping techniques already discussed. Again, rocker-stamping appears to have occupied a very minor place in the vastly complex Latin American ceramic traditions. That it occurs at all in this province is, however, interesting in itself, and when taken in conjunction with the other techniques discussed here, the case for a degree of ceramic interdependency between the southeastern United States and Latin America is considerably strengthened.

Within Latin America, rocker-stamping has so far been discovered in the Valley of Mexico, Honduras, and northern Peru. Its occurrence in the two latter areas has been known for many years, whereas that in the Valley of Mexico has been rumored for some time but not officially reported. A letter from Griffin to Krieger in May, 1946, contained the following statements:

> Stirling told me that Tlatilco, an Archaic site in Mexico City, had rocker-stamped pottery. Some few pieces are in the collection in the Museo Nacional but the site has not been reported. It is a plain rocker stamp on a cylindrical bowl. The position of Tlatilco is not clear except that it is Archaic. These are the only fragments that I have seen.

Thompson illustrates a remarkable vessel of cylindrical shape from a burial vault at Tzimin Kax in the southern Cayo district of British Honduras.[27] On the side of the vessel a seated monkey is incised, and although Thompson does not mention it, the background is filled with what are plainly rocker-stamped lines. Around the rim is a band of Maya glyphs. The burial belonged to the Holmul V period, which "in the Mountain Cow district probably coincided with the last quarter of Cycle 9 and the early part of Cycle 10"[28] in the Maya calendar. According to Thompson's correlation, the vessel would date at about 750–850 A.D.

Strong, Kidder, and Paul, in their archaeological explorations in northwestern Honduras, found rocker-stamped sherds in the deepest level of the Santa Rita site.[29]

In a recent article on the Chavin culture in northern Peru, Tello has illustrated sherds which bear a striking resemblance to rocker-

[26] Moore, 1895, Figs. 4, 44; Pls. LXXII, 2; LXXIX, 3; LXXX; LXXXI, 1, 2. See also Moore, 1903, especially Figs. 151, 154, 155.

[27] Thompson, 1931, Pl. XLVIII and p. 308.

[28] *Idem*, p. 335.

[29] Strong, Kidder, and Paul, 1938, Pl. 9, C, E.

stamped decorations associated with the Hopewellian-Marksville ceramic art in the eastern United States. Thus Tello's Chavin sherds, like Hopewellian Zoned Stamped pottery, show rocker-stamped zones bordered by deep, U-shaped incised grooves.[30] As we understand it, this Peruvian pottery belongs to an early ceramic horizon perhaps closely related to the pottery of the Ancon shell-heaps.

Strong has summarized the implications of these discoveries as follows:[31]

> . . . the present writer has long been impressed with the specific, as well as the general resemblances between the two of these horizons with which he has had most intimate contact. These are the Early Ancon-Supe (Coastal Chavin) horizon in Peru and the Playa de los Muertos horizon in Honduras. Both these spatially widely separated, but apparently generally synchronous, horizons have pottery decorated with broad-line incised bird and other designs. In addition to the predominate use of incising, both used rocker-stamp decoration and both wares are well polished. The same holds true in regard to incised lines occasionally filled with paint. Both horizons likewise contain a few pieces with surfaces partially decorated with crude paint applied in what appears to be an experimental fashion. Closely associated in time with these two old horizons is the trait of negative painting, though in both coastal Peru and Honduras pottery of this type seems to be slightly later than the unpainted incised ware. Resemblances in regard to hand-modeled figurines and other traits link the two culture complexes. . . . It is interesting, whether significant or not, that Marksville (Burial Mound II) sherds from that relatively early horizon in the southeastern United States, when intermingled with those of the Early Ancon period in Peru in the majority of cases cannot be distinguished by experts. . . . If we can demonstrate cultural relationship between all, or a majority, of these emergent New World ceramic horizons we must still explain how such a condition arose. Did the cultural impetus spread from north to south or, vice versa, do we have to call in the concept of convergence under similar ecological and cultural conditions? This we need not, and cannot, answer here, but the problem is becoming very real.

The several matters so far discussed lead us to believe that there is somewhat better evidence for the spread of cultural impetus from the eastern United States toward Latin America, or vice versa, than has generally been realized. Not that the case is at all convincing, but there seems to be less reason, as Strong puts it, "to call in the concept of convergence . . ." to explain the few but striking similarities in certain potteries of the eastern United States, central Mexico and the Maya area, and northern Peru. As to approximate datings, it is generally thought that the Marksville-Hopewellian horizon, falling in Burial Mound II times,[32] existed many centuries later than the early ceramic horizons of Early Ancon-Supe in Peru and Playa de los Muertos in Honduras. In the eastern states the Burial Mound I period, including early Woodland, Adena, and the Tchefuncte cultures, represents a prior ceramic horizon which reveals developmental elements of Burial Mound II pottery. Thus it is commonly supposed that the Marksville-Hopewellian cultures existed at about 1000 A.D., whereas comparable elements in Middle America might date, roughly speaking, somewhere between 1 A.D. and 500 A.D. If this were true, the direction of such borrowing or diffusion as may have taken place would be clear. On the other hand, it must be realized that eastern United States "guess dates" are only reasoned approximations, and may be altered so radically as to place the assumed priority of Middle American cultures in serious doubt, or at least to lessen it considerably.

TRADE POTTERY

The existence of trade wares within various sectors of the Middle American province has received a great deal of attention as regards the interrelationships of Middle American cultures themselves. Thus there are ample records of the passage of trade pottery between the great centers of Maya civilization, Monte Alban, Teotihuacan, Kaminaljuyu, the east and west coasts, and so on.

On the other hand, there is practically no published record of trade wares between Middle America and cultures of the United States.[33] Such trade specimens must be extremely rare, or more would have come to attention by now. In the eastern United States not a single object has come to light which can definitely be identified as a Middle American trade piece despite the large amount of collecting and excavation

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[30] Tello, 1943, Pl. XV, especially top row, middle, and bottom row, second and third sherds, panel B.

[31] Strong, 1943, pp. 32–3.

[32] This terminology was first presented by Ford and Willey, 1941.

[33] Kidder (1936, p. 382 and Fig. 301) describes a potsherd of Mexican origin found at Pecos Pueblo, New Mexico. To this may be added the Mexican spindle whorl found at the same site (Kidder, 1932, pp. 143–4), and the Oaxacan jade from Awatovi, Arizona (Brew, 1940, pp. 346–7).

done. In Mexico and elsewhere in Middle America there seems to be a tendency to set aside odd and unrecognized pieces, and no more is heard of them. The following specimens which have come to our attention, while of unknown association, indicate that greater care and interest may turn up many more such objects, eventually leading to invaluable chronological cross-ties.

The sherd shown in Pl. XII, H agrees precisely with the description of Villa Ahumada Polychrome, which Sayles associates with the Babicora phase in the Chihuahua culture area of northern Mexico.[34] It was included in the surface collection made by Mr. Jack T. Hughes at the Cerro de la Estrella site, Federal District of Mexico, in 1942 (see above). As previously noted, Kroeber had described this as a mixed site, and Mr. Hughes' collection, while preponderately of Aztecan types, contained a few Archaic sherds similar to Ticoman-Cuicuilco. In the illustration, the narrow dark lines and broader gray bands represent black and red colors, respectively, on the original. The background is light gray. This combination of colors was difficult to photograph in black-and-white, but the use of three colors can be seen. The paste is fine-textured, compact, and light grey throughout.

Shortly after the discovery of this sherd, Ekholm brought to our attention a new report by Linné on excavations at Teotihuacan and vicinity. This work contains an illustration of a vessel purchased by Linné at Teotihuacan; he suggested Cholula as its place of origin.[35] However, Dr. A. V. Kidder, Sr., mentioned to Krieger in conversation that he and Dr. Emil W. Haury agreed that the vessel is in all probability Ramos Polychrome, a diagnostic type of the Ramos phase in the Chihuahua culture area.[36] The fact that Linné purchased this specimen may arouse suspicion that it was actually found at Teotihuacan, but Dr. Kidder and others have expressed the opinion that purchase at this locality would be far less open to suspicion than one made, say, in Mexico City. Unfortunately, nothing can be proved by this discovery, but when it is considered with Hughes' sherd from Cerro de la Estrella, it is doubtlessly indicated that trade sherds from the Chihuahua cultures, and perhaps from the Puebloan cultures farther north, may some time be discovered *in situ* in central Mexico.

In the files of the Anthropology Department, University of Texas, is a small collection of potsherds donated by Mr. R. L. Batts of Tampico, Mexico. All the 27 sherds are labeled "Tampico, Mexico," and have been sent to Ekholm for study. He reports that in paste, temper, color, texture, surface treatment, etc., they agree with the extensive collections made by him in the Tampico area.[37] One of these sherds, however, is decidedly out of place in that the surface is covered with a rude corrugated treatment (Pl. XII, K). Corrugation is quite anomalous for any part of Mexico exclusive of Chihuahua, and this piece suggests either a trade sherd from that direction or an application of the corrugating technique to resident Tampico pottery; if the latter, this seems to be the first example to come to light.

Also in the files of the University of Texas is a small anonymous collection from Venezuela which includes two rim sherds with heavy rim coils pinched at intervals. This treatment strongly suggests an early form of Southwestern neck-banding or neck-corrugation, but very similar treatments are found on the rims of jars in northeastern Texas.[38]

CONCLUSIONS

This paper has had one primary purpose: to point out a situation in the archaeology of Middle America and the eastern United States which requires a great deal more attention. In short, there are *indications* that minor, aberrant, and "foreign" ceramic treatments in the Valley of Mexico and elsewhere in Middle America may be related to similar techniques which are common and widespread in various parts of the eastern United States. Whether these traits, chiefly those of cord- and fabric-impression, paddle-stamping, and rocker-stamping (perhaps also corrugation) were independently evolved in Mexico, introduced from the north, or represent minor trade items, cannot yet be determined. One may wonder that the surface collections made in incidental fashion by a single interested individual such as Mr. Hughes could yield such a variety of significant items, while the literature is almost barren of mention of these ceramic traits. At present,

[34] Sayles, 1936, pp. 13–7 and Pl. III.
[35] Linné, 1942, p. 175, Fig. 318.
[36] Sayles, 1936, pp. 45–54, Pls. XI–XII.
[37] Ekholm, 1944.
[38] Krieger, 1946.

there are ample indications that specimens illustrating these features will in time be recognized in their cultural contexts, and thus eventually serve as important indicators of time relationships between cultures very widely separated in space.

The reader is reminded that we have attempted to discuss only a few of the many aspects of ceramic relationships between the eastern United States and Middle America. Thus, Vaillant has published an introductory comparison of vessel forms, including effigy motifs, which has already produced many undoubtedly significant facts, and when extended should produce many more.[39] Willey and Phillips have discussed the use of negative painting on pottery of the Southeast, with its implications of relationship with Middle America.[40] Krieger has for some time been gathering data on comparative decorative techniques such as engraving,[41] incising, punctating, and appliqué, as well as on vessel forms, in the great "Caddo area" and Middle America, with many promising results. When all of these leads can be assembled and factors of time and space be adequately considered, we can begin to discuss the much-talked-of pre-Columbian relationships between the eastern United States and Middle America on an objective basis.[42]

[39] Vaillant, 1932.

[40] Willey and Phillips, 1944.

[41] Engraving is the technique of cutting designs through the hard, usually polished, surface of a vessel in distinction to incising the still-plastic clay; it is commonly called "incising after firing" in Middle American archaeology, but wherever found the practice of filling the lines with powdered ochre pigments seems to have been a constant accompanying feature.

[42] Nothing has yet been offered in this direction which compares in objectivity with Haury's recent listing of Mexican-like traits in the Southwestern culture area (Haury, 1945). The Mexican-Southwestern problem is, however, considerably more compact and the comparable elements on the whole somewhat easier to recognize than in the case of the Southeast and Mexico. The continuing failure of the greater part of Texas to provide the long-sought evidence of cultural diffusion between these areas also poses certain difficulties which only the most cautious procedure will overcome.

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Museum of Anthropology
University of Michigan
Ann Arbor, Michigan

Anthropology Department
University of Texas
Austin, Texas
May, 1946

POSSIBILITIES OF AN ABORIGINAL PRACTICE OF AGRICULTURE AMONG THE SOUTHERN DIEGUEÑO

ADAN E. TREGANZA

MAINLY through force of habit and lack of factual data, the general tendency has been to view Southwestern agriculture as arising from a Basketmaker-Puebloan center. Recently G. F. Carter[1] has clearly demonstrated that, in addition to the above, there was a second center of equal importance and antiquity, mainly in the area occupied by the ancient Hohokam and their successors, the Pima-Papago. It is with the latter center that the present paper is concerned.

Since the Hohokam were apparently instrumental in propagating and adapting a whole series of crops to withstand very rigid desert conditions, it seems logical that we should expect to find survivals of this basic complex among historic groups residing in and peripheral to the ancient center, especially where the same geographic conditions prevail. Certainly, that such is the case is demonstrated by the Colorado River Yumans.

In part it is hoped that this paper will support and expand some of Carter's views relating to the western periphery of the Hohokam center of Southwestern agriculture. The groups to be dealt with are those people living west of the River Yumans, mainly the Kamia and Southern Diegueño.

The data forming the basis for this paper were derived from several archaeological finds of domesticated seeds, one of which provided a quantity of good material.[2]

In July, 1943, a dry cave pottery cache containing seeds of nine species of domesticated plants was discovered four miles northwest of the border town of Jacumba in southeastern San Diego County, California. The cache consisted of three large storage ollas and a globular cooking pot, all of which would fall typologically into a Yuman III classification.[3] The ollas contained maize cobs, the seeds of which had been destroyed by rodents. The cooking pot, having been protected by a stone slab, remained unmolested and contained eight species of seeds. There were an estimated six pounds of seeds, and since each species was wrapped separately in a fragment of modern Caucasian twined, bi-colored textile, it seems certain the cache was intended for planting the following year rather than a food cache. The seeds were identified as follows:

Zea mays. Corn, possibly the early Colorado-Gila Rivers type. Specimens known only through cobs badly gnawed by rodents.

Phaseolus acutifolius. Tepary bean, four types: dark brown, plump;[4] light brown, barely plump; dark brown-on-tan, plump; white, very plump.

Cucurbita moschata. Squash, the thick, corky, sculptured type characteristic of the common Southwestern cushaw.

Cucurbita moschata. Squash, flat and wavy edged, exact type unknown.

Cucurbita pepo. Squash, small, plumpish, non-corkish, non-wavy edged.

Cucumis melo.[5] Large muskmelon.

Citrulus vulgaris. Watermelon, red-seeded.

Citrulus vulgaris.[6] Watermelon, black-seeded.

Sorghum vulgare. Sorghum.

Triticum compactum. Wheat, both the red and white kerneled kinds.

Hordium vulgare.[7] Barley.

This find is singular[8] in nature, yet its presence in the Jacumba area suggests several notable points. Fairly good evidence is offered for

[1] Carter, 1945, 1946.

[2] Appreciation is extended to Mr. J. Dixon and Mr. H. Sharp, finders and donors of the cache; to Dr. H. L. Mason of the University of California Herbarium; to Dr. F. N. Briggs of the University of California College of Agriculture; to Dr. G. F. Carter, Department of Geography, Johns Hopkins University; to Mr. T. W. Whittaker, United States Department of Agriculture; to Dr. C. O. Sauer, Department of Geography, University of California; to Drs. E. W. Gifford and A. L. Kroeber, Department of Anthropology, University of California.

[3] Rogers, 1945, p. 189.

[4] According to Dr. Carter, the dark brown, plump type is grown today only among the Papago. The other types, especially the white, are widely spread. Correspondence, 10/20/43.

[5] Mr. Whittaker states, "I think it more likely that the seed of *Cucumis melo* is probably that of a large muskmelon rather than a casaba. It is certainly not one of our heavily netted, small cantaloupe types." Correspondence, 3/6/44.

[6] Among the commercial varieties at the present time, most are white- or brown-seeded, except those of the Klondyke type. However, there are a few black-seeded strains among some varieties.

[7] Same type of barley as that introduced by the early Spanish missionaries.

[8] Two other caches of maize cobs were found by the author in the same region in 1939. The archaeological occurrence of gourd rattles should also be noted. Treganza, 1942.

the practice of Indian agriculture in a region which has been considered a non-agricultural area. This is not meant to imply a widespread practice or a well-developed complex for the area, but should be interpreted as a sporadic occurrence in a region which is peripheral to an area of specialized agriculture.[9]

The species found in cache are identical to those which composed the basic agricultural complexes of the Pima-Papago groups and the Lower Colorado River Yumans in the early historic period. The distance separating the cache from these groups is not so great in terms of distance (*ca.* 60 miles), but in terms of geographic barriers the barren, dry Salton Sink speaks for itself.

The location of the find on the crest of the Peninsular Ranges (elevation 3000 ft.) is likewise of interest, as it marks an attempt by the Indians, at least in historic times, to extend agricultural practices into an area where geographical conditions limited any large-scale production on a primitive basis. Though this is a region of arid summers with occasional late thunder showers, of winter rains, late frosts, and light desert soils, it lacks large river courses and flood-plain valleys where annual flood inundation might occur. Therefore, any sort of agricultural practice would probably be limited to such small protected areas as the Jacumba Valley, where summer aridity could be overcome by the use of spring water for irrigation, supplemented by occasional thunder showers. This would not affect wheat and barley, however, as they were winter crops and could take advantage of the seasonal rains.

Although the presence of modern textiles dates the find in the post 1850's,[10] it does not preclude the assumption that similar practices might have been carried on at a much earlier time, for both the archaeological[11] and ethnological[12] data demonstrate the close relationship between the area occupied by the Southern Diegueño-Kamia and the Gila-Colorado region. The following is a presentation of the evidence which in the opinion of the author, supports such an assumption.

In pre-contact times, following the formation ancient Lake Cahuilla in the Salton Sink (Imperial Valley), certain Yuman groups moved into that area and along the overflow channels which led in from the Colorado River.[13] If agriculture was known to the Colorado River Yumans at this time (about 900 A.D.), then knowledge of it, if not actually its practice, should have been transmitted westward by the Yuman people who occupied the newly created habitat along the shores of the fresh water lake, where conditions were favorable for cultivation, with little or no deviation from the original pattern. From here, it is only a short distance up into the mountains to the area under consideration.

The distribution of pottery types[14] clearly shows a continuity from the Colorado River to the Pacific Coast, including the area in the Peninsular Ranges occupied by the Southern Diegueño at the time of contact. Especially significant is the archaeological occurrence in the Diegueño territory of pottery figurines with coffee-bean eyes. These resemble in style the figurines of the Hohokam which were made in, and limited to, the Santa Cruz phase, dating approximately from 700 to 900 A.D. I mention these connections to suggest a point in time and a convenient route over which agriculture may have passed in aboriginal times. There is at present but a small amount of material evidence to support such a thesis.

No doubt Mission contact had a profound effect on the Indians, especially in certain areas, in stimulating increased production of the original staple crops as well as in introducing new ones. Particularly was this true of the Pima and Papago groups under the guiding hand of Father Kino[15] and the Padres succeeding him. The extent to which this new stimulus affected groups further west along the Colorado River and Salton Sink is uncertain, for there agriculture was only supplemental to a hunting-gathering complex.

By observing the distribution of Old World crops in America, especially where the place and time of introduction are known, we can readily retrace aboriginal lines of diffusion. Noteworthy are the examples of wheat and

[9] Lower Colorado and Gila-Salt river regions.

[10] One of the fragments of modern material was sewn by means of a native milkweek fiber cord.

[11] Heizer and Treganza, 1944, p. 305, Map 7; Rogers, 1936, 1941, 1945; Treganza, 1942, 1945.

[12] Drucker, 1937, 1941; Gifford, 1931, 1933; Kroeber, 1928; Spier, 1923, 1936; Strong, 1929.

[13] Rogers, in Jaeger, 1938, p. 122; and 1945.

[14] Rogers, 1936; Treganza, 1942.

[15] According to T. W. Whittaker, it is quite possible that the material introduced by Kino in 1687 might well be ancestral to the *Citrulus vulgaris* and *Cucumis melo* found in this present cache. Correspondence, 3/6/44.

watermelon which, after their introduction on the west coast of Mexico[16] in the sixteenth century, spread northward so rapidly through Sonora and southern Arizona to the Lower Colorado River that by the time of first Mission contact among the Pima and Papago (Kino in 1687) these two crops were well incorporated into the native agricultural complex.

There seems to be difficulty in tracing the spread of agriculture in early historic times from southern Arizona to the Peninsular Ranges in California. Two possible routes stand out: one from the Pima to the Maricopa, down the Gila River to the Yuma and from there to the Kamia of the Salton Sink (Imperial Valley); the other, a more southern route, through Sonora via the Sand Papago to the Cocopa, who were in direct contact with the Kamia. This latter seems less probable since the Sand Papago were only sporadic farmers.

That the modern Kamia have ventured up into the Peninsular Ranges for the purpose of planting crops has been noted by Gifford.[17] His informant, a Kamia, stated that several lineages planted watermelons, pumpkins, maize, teparies, and cowpeas in the Jacumba Valley. They watered their gardens by conducting water in ditches from a spring[18] which filled at night. The informant claimed no Mexicans were living there at the time. The seed cache treated in this paper tends to confirm the informant's statement.

The mention of spring irrigation by Gifford's informant introduces a debatable point. Gifford's reaction to this feature was "this type of planting must have been due to Caucasian influence, perhaps from the Missions." Presumably his conclusions were based on the fact that the Kamia, Cocopa, and Yuma never irrigated but depended upon the annual inundation of the river flood-plains. This conclusion is a safe one but it should be considered that the groups treated by Gifford did not require any type of canal or ditch irrigation to carry on their incidental farming activities. Unlimited areas of suitable land which was annually flooded were available merely for the clearing.

That the river Yumans were aware of the principles of irrigation is quite certain, for their close contact with the peoples of the Gila River must have brought this feature within their range of vision. Likewise, the fact that Yuman groups along the Colorado and its overflow channels used brush weirs to divert flood waters in order more fully to inundate cleared plots is evidence that they were conscious of the idea of water diversion. This is the basic principle underlying canal irrigation.

As applied to the problem of irrigation of crops by ditches from springs might be further examined with the possibility in view that it could be a native practice rather than one introduced by the Padres. Looking eastward, we find in the region of the ancient Hohokam an area of intensified agriculture united with an elaborate irrigation system. We also find the Pima using canals in the same region at a later time. Whether or not the Pima-Papago groups are the direct descendants of the ancient Hohokam is still uncertain; it is, however, quite certain that the domesticated agricultural staples and the techniques of producing them represent a continuation from older times. As one might expect, one finds certain of these surviving practices around the periphery of the area, especially in regions where the geographical and cultural environment has placed restrictions on the type and degree of agriculture which could be carried on. To cite a few specific examples:

Castetter and Bell[19] point out that flood-water farming among the Papago was more of an environmental imposition than anything else, for where sufficient water was available, ditch irrigation was practiced.

Mange[20] noted the Papago of San Marcelo de Sonoita were irrigating by means of ditches leading from the arroyo and that a similar method was used at a *rancheria* near Caborca at the close of the seventeenth century.

Anza[21] noted the Papago were irrigating small pieces of land with running water from springs at Sonoita and Quitobach.

Somewhat to the northeast and likewise in a rugged habitat, we find that among the Walapai, where watered ground suitable for cultivation is excessively scant, occasional families living by a spring or summer stream cultivated little plots.[22] Patches consisting of a square foot of soil were loosened with a stick and small walls were built around these to retain water from the creek or spring.

Gifford[23] reports for the Southeastern Yavapai that agri-

[16] Castetter and Bell, 1942.

[17] Gifford, 1931.

[18] Probably the original Jacumba Hot Springs or Iron Springs, both of which are on the Mexican side of the international border.

[19] Castetter and Bell, 1942, pp. 161–2.

[20] Mange, 1926, pp. 262–85.

[21] Bolton, Anza, II, 1930, pp. 22, 148, 150.

[22] Kniffen, 1935, pp. 57–60.

[23] Gifford, 1932, p. 214.

culture was at a minimum, one of the reasons being a lack of favorable localities for cultivation. The only example noted by him occurred where the soil was level and kept suitably moist by a spring.

The region under consideration suggests a situation comparable to that among the groups mentioned. As there, the degree of agriculture may have been limited by local environment.

If the practice of agriculture in the Jacumba Valley possessed any antiquity, and this is a possibility, then Mission contact would have little affected the original pattern. If, however, the present cache is to be attributed to direct Caucasian or Mission introduction, one would expect to find more Mission crops represented. The presence of the dark brown, plump tepary bean should be noted. According to Dr. Carter this type is grown today only among the Papago, which strenthens the assumption that the Jacumba assemblage of seeds originally arrived in the Jacumba Valley through native transmission.

By way of contrast, the Cahuilla, who were the northern neighbors of the Diegueño, present an excellent example of missionization. In 1900[24] Barrows noted the following:

> On the reservation they (the Cahuilla) raised cattle, especially in the mountain Cahuilla Valley. They planted maize, beans, peas, potatoes, watermelons, squashes, and in the mountains, also wheat and barley. All but the last two required irrigation, and for this purpose they made small reservoirs in the mountains by digging and deepening the springs and excavating rude *sanjas* or irrigation ditches. In the Cabezon Valley they conducted the water short distances out of the canyons in which it trickles, or at certain villages they irrigated small patches from their wells.

The only practice mentioned here which was native are wells, and these were used for drinking purposes and not for watering gardens.

On the basis of the above data I do not feel that irrigation from springs should be completely eliminated as an aboriginal trait among the Southern Diegueño. It might well have been a practice accompanying the prehistoric seed complex and showing up in an area where geographical conditions impose the restrictions mentioned. In such a situation agriculture would have been incidental to the basic pattern of hunting and gathering and should be considered a late aboriginal acquisition.

The purpose of this paper has been to suggest a few problems relating to Yuman prehistory, rather than to question too strongly any pre-existing ideas. I have attempted to bring the question, if such, of Southern Diegueño agriculture up to date by assembling both the archaeological and ethnological data which are at hand. The relative value of the points discussed here will, I hope, find its place in supplementing the over-all picture of the cultural position of the Yuman peoples.

[24] Barrows, 1900.

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Pottery types from Kamchatka (after Jochelson and Schnell): A–F, Kulki Cord-marked; G, Kulki Punctated; H, Kavran Incised; I–K, Nalacheva Striped; L, Listvenitchnaja Punctated; M–N, Kuril Lake Plain.

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THE PREHISTORY OF KAMCHATKA

GEORGE I. QUIMBY

THE peninsula of Kamchatka in Siberia is situated between the Sea of Okhotsk on the west and Bering Sea and the Pacific Ocean on on the east. This peninsula is about 750 miles long and 80 to 300 miles wide with a mountainous and volcanic interior and a somewhat severe climate. Forests cover all the land except where there are areas of tundra or alpine vegetation.

Land mammals, especially bears, were plentiful in the interior, whereas sea mammals lived in the waters along the coast. Fish, particularly salmon, were abundant in the rivers, lakes, and coastal waters.

At the time of their discovery by the Russians, the aboriginals of Kamchatka were the Kamchadal and the Koryak. Most of Kamchatka was occupied by the Kamchadal, but the Koryak territory included the northern part of the peninsula. The Kamchadal were semisedentary fishermen dwelling by the rivers, lakes, or sea. The Koryak were nomadic herders of reindeer as well as hunters and fishermen.

The archaeological remains found in Kamchatka by various investigators probably are indicative of the ancestral Kamchadal and Koryak cultures as they existed in periods before Russian discovery.

A number of scholars have undertaken archaeological investigations in Kamchatka. Foremost among them was Waldemar Jochelson, who excavated sites in northwestern, southern, and eastern Kamchatka (Jochelson, 1928). Some sites in southeastern Kamchatka, excavated by the Swedish-Kamchatka expedition were described by Sten Bergman (1926) and Ivar Schnell (1932). D. N. Lev (1935) reported some additional finds from southeastern Kamchatka and E. Nakayama (1933) published the results of his researches in northeastern Kamchatka. All of these researches were summarized by E. Mott Davis, Jr. (1940).

In attempting to use, for comparative purposes, some of the data from the abovementioned sources, it was felt that the cultural complexes warranted more specific definition. In order to define the cultural complexes more rigidly, it became necessary to re-define the types of artifacts, particularly pottery.

Jochelson's report (1928) contains most of the data of Kamchatka archaeology as well as the basic interpretations. However, because of

some unfortunate errors, it is difficult to correlate some of the illustrations with their respective descriptions and proveniences.

Both Jochelson (1938) and Schnell (1932) gave adequate attention to the description of artifacts other than pottery. I do not feel that they manipulated their pottery data sufficiently. Consequently, I have devoted a special section to pottery, although other artifacts, house types, and the like will be described briefly in the section on cultural complexes.

POTTERY FROM KAMCHATKA

Pottery types are abstractions of varying degree. They are formulated in terms of lesser abstractions which are the attributes or traits or characteristics of individual pottery vessels or sherds. Least abstract are the individual vessels and sherds.

Briefly outlined, the process of pottery typing is as follows: Sherds or whole vessels which appear to be similar are grouped together. Such grouping (classifying) is, of course, influenced by the previous experience of the operator and some sense of problem either conscious or subconscious.

In the next operation traits, attributes, or characteristics are abstracted from the individual sherds and vessels which have been grouped upon the basis of apparent similarity or dissimilarity. This operation also is influenced by the classifier's previous experience and some sense of problem either conscious or subconscious.

Finally the type is constructed in terms of the previously formulated criteria. Thus the pottery type is a variable assemblage of traits, characteristics, or attributes which have been abstracted from whole vessels and sherds. As used by me the concept of type is one that attempts to include all of the uniques (individual vessels and sherds) grouped together in the first level of operation.

The test of the validity of a type is its utility within a given context or frame of reference. Such validity is, of course, a relative relationship. The degree of abstraction of the type probably should vary in relation to the degree of abstraction of its context or frame of reference.

If scientifically acceptable, the type has a scientific reality, a reality within a given context. We cannot know, nor do we need to know, if our construct, a given pottery type, correlates with a cultural concept of the aboriginal potters who made the pottery described by our given type. Probably upon some levels of abstraction there is a high degree of correspondence between the pottery type of the aborigines and the pottery type of the archaeologist, but it cannot be proved.

The ceramic data presented here have been taken from secondary sources. None of the pottery has been observed directly. Nevertheless, by using the pictures, descriptions, and statements of Jochelson (1928) and Schnell (1932) it has been possible to manipulate these secondary data as if they were primary data. For instance, Schnell's picture of a given pottery vessel is a reasonably adequate substitute for the actual vessel insofar as one is able to abstract the traits of form, decoration, and surface treatment from the published photograph. His description of size, temper, or other attributes are assumed to correspond reasonably well to the first-order abstractions of the same kind which I might have formulated in terms of the primary data.

The ceramic data of Jochelson have been similarly treated, but with more difficulty. Jochelson's data are not so well described and his published photographs could be much better. Nonetheless, a diligent search of his reports (1908, 1928) has produced enough data for the operations I desire to undertake.

The pottery types of Kamchatka are the following: Kulki Cord-marked, Kulki Punctated, Kavran Incised, Nalacheva Striped, Kuril Lake Plain, Listvenitchnaja Punctated, Nayakhan Cord-marked, and Nayakhan Striped. The construction of these types may seem overly ambitious and risky in view of the small quantity and secondary source of the available data. Should the reader reject these types, he must nevertheless realize that each of the types could easily be represented merely by the abstracted traits of design. For instance, if Kulki Cord-marked is rejected as a type, one would still have to accept the same grouping of pottery upon the basis of traits of ornamentation such as impressed design, simple geometric pattern, and the like. Thus, in any operations dependent upon the types, small groups of traits could be substituted for the types and the end results would remain unchanged. These types, therefore, need corroboration but are nevertheless quite usable in their present state. The types are described somewhat in the style adopted by the Southeastern Archaeological Conference (cf. Ford and Quimby, 1944).

POTTERY TYPE DESCRIPTIONS

Kulki Cord-marked (Pl. XIII, A–F)

Paste. Probably grit-tempered, but Jochelson does not specifically say so. However, his constant use of grit-tempered "Koryak" pottery as an analogue for this type suggests grit tempering. There are no data on color, hardness, texture, or method of manufacture. This pottery seems to have been relatively well fired.

Surface treatment. Surfaces bear the imprint of a cord-wrapped paddle or the impressions of closely twined matting. The individual cord impressions are at right angles to the plane of the rim. Jochelson believes the impressions to be those of closely twined basketry, but the example he cites for illustration of his point (Jochelson, 1908, p. 639, Figs. 161, 165a) is, in my opinion, indistinguishable from a paddle closely wrapped with cord. Consequently I am not concerned with the exact identity of the stamp. It is either a cord-wrapped paddle or closely twined basketry or a coarse fabric closely twined. For convenience I choose to call it a cord-wrapped paddle.

Decoration. The decoration is confined to the rim or upper shoulder area and consists of simple geometric arrangements of punctates, cord impressions, or pseudo-cord impressions which might have been produced with a crenulated stamp such as provided by the edge of a pecten shell. The pseudo-cord impressions bear some resemblance to the type of stamping produced by the edge of some pecten shells.

The rim design usually consists of a band of closely spaced, horizontal cord or pseudo-cord impressions which are parallel and encircle the vessel. Such bands are usually bordered by a single row of closely spaced punctates. The bordering row of punctates is beneath the band of cord or pseudo-cord impressions, although there may also be a row of punctates at the top of the band, or a row of punctates in the middle of the band. If a row occurs in the middle of a band, this row of punctates is a substitute for one or two of the encircling cord impressions, or pseudo-cord impressions made with a stamp.

The punctate impressions are round, ovoid, wedge-shaped, and S-shaped. The wedge-shaped punctates appear to have been made with cords or a cord-wrapped stick.

By and large, the decoration and surface treatment of this pottery is suggestive of Woodland types found in the northern part of the upper Great Lakes region of the United States.

Form. Data on form are lacking or uncertain. It is possible, however, to make a few surmises based upon Jochelson's descriptions and illustrations. The vessels seem to be small or medium-sized jars with direct, slightly incurved rims. The body of the jar is relatively long, the mouth diameter is smaller than the greatest diameter of the body, and the bottom tends to be conoidal or rounded.

Crack-lacing holes (Pl. XIII, D) are present and were presumably drilled into the fired pottery. Holes, punched through the rim while the clay was still plastic, probably were used for cords or thongs by means of which the pot was suspended over the fire. The sooty condition of many of the sherds may corroborate this thesis.

Geographical range of type. Along the Kulki River and at Palan in northwestern Kamchatka.

Bibliography. Jochelson (1908, pp. 639 ff.; 1928, pp. 50, 76–7, and Pl. 19A); de Laguna (1940, p. 69, Fig. 8: 8); Schnell (1932, pp. 60–2). This type would be included in Jochelson's "Northern type pottery" and in Schnell's "Type III" pottery.

Kulki Punctated (Pl. XIII, C)

Paste. Probably grit-tempered.

Surface treatment. Exterior surfaces of sherds seem to have been malleated with a cord-wrapped paddle, or in any event treated in the same manner as those of the type Kulki Cord-marked.

Decoration. The decoration, perhaps confined to the rim area, consisted of nearly horizontal rows of small round punctate impressions closely spaced.

Form. Data are lacking. Pottery seems to be relatively thin and well-made in contrast to Eskimo pottery, for instance.

Geographic range. Along Kilki River in northwestern Kamchatka.

Bibliography. Jochelson (1928, pp. 76–7, Pl. 19A); Schnell (1932, p. 60). This type would be included in Jochelson's "Northern type pottery" and Schnell's "Type III" pottery.

Kavran Incised (Pl. XIII, H)

Paste. Grit-tempering is suggested by Jochelson's comparison of this pottery type with Koryak pottery (1928, pp. 76–7), but he does not state specifically that the specimens are grit-tempered. This pottery seems to have been well fired.

Surface treatment. Vessel surfaces seem to be rough (roughly smoothed) and some may have been malleated with a cord-wrapped paddle, although it is uncertain (*Idem*, 1928, Pl. 19B).

Decoration. Decoration seems to have been confined to the rim and was produced by incising, punctating, and perhaps combing. The designs were simple and geometric. They were composed of parallel, incised lines, somewhat closely spaced so as to produce a horizontal band encircling the rim. A horizontal row of rectanguloid punctates (with long axes vertically placed) was placed just beneath the incised rim band or between the two topmost of the horizontal incised lines of the rim band.

Form. No complete vessels were found, but the illustrations of sherds (*Idem*, 1928, Pl. 19B) suggest some form of small jar.

Geographic range. Along the Kavran River in northwestern Kamchatka.

Bibliography. Jochelson (1928, pp. 76–7, Pl. 19B; de Laguna (1940, p. 69, Fig. 8: 9); Schnell (1932, p. 60). This type would be included in Jochelson's "Northern type pottery" and in Schnell's "Type III" pottery.

Nalacheva Striped (Pl. XIII, I–K)

Paste. Probably tempered with sand or grit: "coarse clay" (Jochelson, 1928, p. 76).

Surface treatment. Vessel surfaces are smooth. According to Jochelson (1928, p. 76) this type has a surface smoother than that of Kuril Lake Plain.

Decoration. The outside of the upper rim of the vessel is decorated with four or five horizontal parallel stripes or

ridges which are closely spaced. These stripes encircle the vessel. According to Jochelson (1928, p. 76), "the decorative lines were made when the clay was still wet, by a bone instrument," like that shown on Jochelson (1928, Pl. 16, Fig. 10). De Laguna (1940, p. 69) believes that the stripes were "produced by applied ribbons of clay." Whatever the technique actually was, the end result is recognizable and lends itself to classification.

Form. The form of this vessel is that of a deep pot with vertical, slightly convex sides, a direct rim with a rounded or flattened lip, and perhaps a flat bottom, but this is uncertain. The size is not given, but Jochelson believes that the pots were relatively deeper than those of the type Kuril Lake Plain.

Geographic range. Northern and southern Kamchatka.

Bibliography. Jochelson (1928, p. 70, Pls. 17: 2, 18, and 19B); de Laguna (1940, p. 69, Fig. 8: 7); Schnell (1932, pp. 60, 62, 64).

Kuril Lake Plain (Pl. XIII, M, N)

Paste. The paste, tempered with coarse sand or grit, is flaky and tends to scale apart. The color is brown to smoke-black. The paste is crude and seems to have been shaped by direct modeling.

Surface treatment. The vessel surfaces are smooth but coarse.

Decoration. None. Vessels are plain, although some have one or two thin ridges (possibly appliqué) encircling the exterior at the level of the handles.

Form. The form of these vessels is that of a flat-bottomed, deep bowl or pot with slightly convex, outslanting sides, a direct rim, and a somewhat flattened lip. Each vessel has two or three (perhaps more) small loop handles placed around the upper rim on the exterior of the bowl or pot. Examples of this type from Listvenitchnaja Bay have small castellations or rim points placed approximately above each handle.

As pointed out by Jochelson (1928, p. 73), these handles probably were used to suspend the pot over a fire by means of cords. Jochelson (1928, p. 75) also indicates the similarity of these pottery vessels to iron pots.

The pottery vessels were about 1 cm. thick with a maximum diameter of 30 to 45 cm. and a height of 15 to 20 cm.

Geographical range. Southern Kamchatka and possibly the northern Kurils. In Kamchatka this type of pottery occurred in the regions of Kuril Lake, Nelacheva Cape, and Listvenitchnaja Bay.

Bibliography. Jochelson (1928, pp. 73–6; Pl. 17: 1, 3; Pl. 18); de Laguna, 1940, p. 69, Fig. 8: 6); Schnell (1932, pp. 60, 62, 63; Pl. XV: 1, 1a, 2). Kuril Lake Plain corresponds to Schnell's "Type I" pottery and to Jochelson's "Pots and pans with ears inside."

Listvenitchnaja Punctated (Pl. XIII, L)

Paste. Probably sand or grit-tempered. Color is brown inside, smoke-black outside.

Surface treatment. Poorly smoothed.

Decoration. The decoration, confined to the outside of the upper rim, consists of a horizontal row of closely spaced punctate impressions. Punctate impressions arranged in semicircles (with convex part downward) adjoin the horizontal row of punctates.

Form. The few criteria available suggest a form like that of the type Kuril Lake Plain. The sherd illustrated by Schnell (1932, Pl. XV: 3) has a small castellation or point (knob) on the rim beneath which, on the inside, the remains of a handle are traceable. Thus, as Schnell indicates, "... it is only the simple decoration that distinguishes this ..." type from Kuril Lake Plain.

Geographic range. Listvenitchnaja Bay in southeastern Kamchatka.

Bibliography. Schnell (1932, p. 62, Pl. XV: 3).

Nayakhan Cord-marked

Paste. Coarse clay, tempered with fine gravel and pieces of quartz, was well fired and blackened with soot from use.

Surface treatment. Vessel surfaces were covered with the imprints of a cord-wrapped paddle or of a paddle wrapped with close-woven, twined fabric or basketry. In my opinion the two techniques are indistinguishable, except in extreme cases. The cord imprints are at right angles to the rim.

Decoration. None mentioned.

Form. The form illustrated by Jochelson (1908, Fig. 165a) is that of a deep jar with direct, incurving rim and a semi-conoidal bottom. The jar was about 24 cm. high, had a diameter of 21 cm. at the mouth, and walls 4 to 8 mm. thick. One rim sherd was indicative of a still larger vessel.

Geographical range. Western shore of Gishiga Bay between the rivers Nayakhan and Gishiga northwest of Kamchatka proper, and perhaps also in northwestern Kamchatka.

Bibliography. Jochelson (1908, p. 639, Fig. 165a; 1928, pp. 76–7).

Nayakhan Striped

Paste. Same as Nayakhan Cord-marked.

Surface treatment. Not given. Appears to have been smoothed.

Decoration. Ornamentation, perhaps confined to the rim, consisted of adjoining furrows and ridges in a horizontal band. These furrows and ridges run parallel to the rim and could have been produced by trailing one's fingers around the rim of the vessel while the clay was still plastic. One rim sherd was 8–12 mm. thick.

Form. No information. Probably jar-shaped.

Geographical range. Along the western shore of the Sea of Okhotsk between the rivers Nayakhan and Gishiga northwest of Kamchatka proper and also in northwestern Kamchatka.

Bibliography. Jochelson (1908, p. 639, Fig. 165b; 1928, pp. 76–7, Pl. 19B, large sherd at right in next to bottom row; this plate is upside down).

THE CULTURAL COMPLEXES

The Nayakhan complex (Jochelson, 1908). Remains indicative of the Nayakhan complex were found at the mouth of the Nayakhan River and between the rivers Nayakhan and Gishiga on the western shore of the Sea of Okhotsk northwest of Kamchatka proper.

Characteristics of this complex were: oval pit houses without entrance passages; low earthern embankments around perimeters of pits; central hearths; pottery of the types Nayakhan Cord-marked and Nayakhan Striped; leaf-shaped projectile point of flint; ovate knives or ulus of ground stone; ovoid lamp made of whale vertebra; and a bone object shaped like the head of a hammer.

The Kulki complex (Jochelson, 1928). Remains indicative of the Kulki complex were found near the mouth of the Kulki River and near Palan in northwestern Kamchatka. Characteristics of this complex were: oval pit houses without entrance passages; oval enclosure of earth, perhaps a palisade, surrounding the pit houses; pottery of the types Kulki Cord-marked and Kulki Punctated; leaf-shaped projectile point of chipped stone with concave sides; assymetric leaf-shaped projectile point of chipped stone; and cylindrical pestle of stone.

The Kavran complex (Jochelson, 1928). The manifestations of the Kavran complex were found near the mouth of the Kavran River in northwestern Kamchatka. Characteristics of this complex were: oval pit houses without entrance passages; oval inclosure, perhaps a palisade, surrounding the pit houses; pottery of the types Kavran Incised and Nayakhan Striped; pointed oval lamps of stone; pointed stone lamps with handles; sadiron-shaped lamps of stone; polished stone adzes; partly polished stone adzes; leaf-shaped projectile points of chipped stone; chipped stone leaf-shaped points with chisel-shaped base; chipped stone, leaf-shaped projectile points with round base; leaf-shaped blades of chipped stone; chipped stone blades with one shoulder; semi-lunar knife of ground stone; ovate, plano-convex scrapers of chipped stone; ovate and triangular scrapers of chipped stone; polyhedral and semi-polyhedral cores of stone; stone net sinkers with notches; cylindrical pestles; drill socket of stone; shallow mortar or grinding stone; whetstones; and hammerstones.

Some additional characteristics of this complex were: bone root diggers; bone arch for dog sled; bone spades; bone knife with pyramidal tang; bone hooks; fragments of iron; and fragments of Japanese porcelain cups.

The Kuril Lake complex (Jochelson, 1928). Manifestations of the Kuril Lake complex were found on the shores of Kuril Lake and on the banks of the Osernaya River, two miles from Kuril Lake, in southern Kamchatka. Characteristics of this complex consisted of: oblong pit houses with entrance passages; pottery of the type Kuril Lake Plain; oval lamps of stone; pointed oval lamps of stone; pointed stone lamps with handles; sadiron-shaped lamps; polished stone adzes; adzes of stone partly polished and with flake scars; leaf-shaped projectile points of chipped stone; chipped stone leaf-shaped points with chisel-shaped base; chipped stone leaf-shaped points with round base; leaf-shaped point with small shoulders; curved blades of chipped stone; chipped stone blades with two shoulders; leaf-shaped blades of chipped stone; a crescentic blade of chipped stone; ovate, plano-convex scrapers of chipped stone; triangular scrapers of chipped stone; chipped stone drills; notched stone sinkers; grooved stone sinkers; perforated stone sinkers; cylindrical pestles; whetstones; and hammer-stones.

Some additional characteristics of this complex were: bone foreshafts with conical tang at one end and bifurcation at the other; spatulate arrowheads of bone; a bone screw with double threads; a simple, unbarbed harpoon head of bone; bone awls; bifurcated awls of bone; comb-like objects of bone; perforated seal teeth; decorated buckle of bone with engraved circles, zigzags, and guilloches; denticulated objects of bone; wooden vessel fragments; textile remains; iron implements; a copper implement; and Japanese coins of the eleventh century after Christ.

The Nalacheva complex (Jochelson, 1928). Remains of this complex were found at Nalacheva Bay, Nalacheva River, and Nalacheva Cape in southern Kamchatka. Characteristics of the complex were: oblong pit houses with entrance passages; pottery of the types Kuril Lake Plain and Nalacheva Striped; pointed oval lamps of stone; polished stone adzes; leaf-shaped projectile points of chipped stone; chipped stone leaf-shaped point with round base; chipped stone leaf-shaped blades; notched stone sinkers; cylindrical pestles; and whetstones.

The Avatcha complex (Bergman, 1926; Jochelson, 1928; Lev, 1935; and Schnell, 1932). Remains of this complex were found in the vicinity of Salt Lake, Boratyrevskaya Bay, and Tarja Inlet on the shores of Avatcha Bay, in southern Kamchatka. Characteristics of the complex were: oblong pit houses with entrance passages; pottery of the type Kuril Lake Plain; oval lamps of stone; polished stone adzes; partly polished stone adzes with flake scars; leaf-

shaped projectile points of chipped stone chipped stone leaf-shaped points with chisel-like base; chipped stone leaf-shaped points with round base; chipped stone leaf-shaped points with straight base; ground stone spear points, diamond-shaped with elaborate bases; leaf-shaped blades of chipped stone; chipped stone blades with two shoulders; chipped stone blades with one shoulder; ovate, plano-convex scrapers of chipped stone; ovate and triangular scrapers of chipped stone; perforated stone sinkers; whetstones; hammerstones; a labret of stone; and a figurine of chipped stone.

The Listvenitchnaja complex (Bergman, 1926, pp. 255–7; Schnell, 1932). Manifestations of this complex were found along the shore of Listvenitchnaja Bay in southeastern Kamchatka. Characteristics of the complex were: round (?) pit houses with entrance passages (?—description is vague); pottery of the types Kuril Lake Plain and Listvenitchnaja Punctated; pointed oval lamps of stone; polished stone adzes; partly polished stone adzes with blade scars; and whetstones.

The Ust-Kamchatsk complex (Nakayama, 1933). This complex was found at Ust-Kamchatsk in northeastern Kamchatka. It was characterized by round (or oblong with rounded corners?) pit houses with entrance passages; polished stone adzes; partly polished stone adzes with flake scars; leaf-shaped projectile points of chipped stone; chipped stone leaf-shaped points with chisel-like base; chipped stone leaf-shaped points with round base; chipped stone leaf-shaped points with straight base; chipped stone blades with one shoulder; triangular chipped stone points with winged base; rectanguloid scrapers of chipped stone; and chipped stone drills.

GROUPING OF THE CULTURAL COMPLEXES

Any consideration of the relationships of the cultural complexes must take into account the unevenness of the archaeological record. For instance the lack of bone artifacts in the Kulki complex or the lack of pottery at Ust-Kamchatsk may have cultural significance or may be merely a reflection of the lack of thorough investigation. It seems impossible to judge which. However, in terms of what positive evidence is available there seems definitely a southern and northern grouping of complexes, just as Jochelson (1928) stated it to be.

All of the complexes seem to share a common lithic industry very similar to that of the Aleutian Islands. But house styles and pottery types distinguish the southern group of complexes from the northern group.

The southern group (Kuril Lake, Nalacheva, Avatcha, and Listvenitchnaja) share the pottery type Kurile Lake Plain and (except possibly for Listvenitchnaja) the oblong pit house with entrance passage. As Jochelson (1928) and Schnell (1932) have demonstrated, the southern group of complexes is oriented toward the ancient Ainu of the Kuril Island chain.

The northwestern group of cultural complexes (Kulki and Kavran on Kamchatka Peninsula and Nayakhan on the Siberian mainland) share the round pit house without entrance passage and a ceramic tradition quite distinct from that of the southern group. The resemblance seen by Schnell (1932) between the pottery types I have called Kulki Punctated and Listvenitchnaja Punctated is, in my opinion, very superficial. Schnell, himself, recognized that Listvenitchnaja Punctated was a close relative of Kuril Lake Plain. There is, in my opinion, only a remote resemblance between Nalacheva Striped and Nayakhan Striped not indicative of any relationship upon the level of operation I wish to pursue. Thus there seems to be no close relationship between any pottery types of the southern group of complexes and those of the northwestern group.

TEMPORAL POSITIONS OF THE CULTURAL COMPLEXES

In the absence of any recorded stratigraphy, it is difficult to determine the chronological relationships of the cultural complexes. Probably there are some considerable time spans within complexes. For example, Jochelson (1928, p. 61) believed that one group of pit houses on the shore of Kuril Lake were older than another group in the immediate vicinity. Nevertheless, the cultural contents of both of these groups of pit houses were lumped together, and therefore must be treated as a single complex for the present. On the other hand complexes such as Kavran probably are only indicative of a short period of occupancy.

The Kuril Lake complex can be dated loosely by the presence of Japanese coins in the cultural deposits. All of these coins were of the eleventh century of our era. Jochelson states (1928, p. 37), "In the excavations of many pits (houses) on the shores of Kuril Lake, I found brass coins of the eleventh century . . . ." Only four of these Japanese coins are listed in the

section of Jochelson's text dealing with the Kuril Lake excavations. Three coins came from pit houses on the south shore of Kuril Lake. Another coin and some pottery sherds of the type Kuril Lake Plain, were found in the entrance passage of a pit house on the bank of the Osernaya River some two miles from Kuril Lake. Implements of iron and copper found in the Kuril Lake sites are additional evidence of some kind of contact with Japanese culture.

The Japanese coins indicate that the late stages of the Kuril Lake complex were not earlier than the eleventh century after Christ and probably not later. Jochelson states (1928, p. 37), "As the coins were only of one period we may draw the conclusion that at that period the Japanese trade with Kamchatka, through the Aino-Kurilian intermediary, was quite extensive. . . . Thus the Kamchadal got from the Kurilians swords, needles, iron pans, cotton stuff, dresses made of bark fiber, armors, plumb and silver earrings, (and) belts with silver buckles, in exchange for fur-skins, before the Russians introduced metallic objects to them."

The Kavran complex also shows contact with Japanese culture by virtue of porcelain cup sherds and fragments of iron. Unfortunately, these objects of trade do not point to specific periods as do the coins, but they may well be indicative of some interval between the eleventh and seventeenth centuries.

SUMMARY

Although Kamchatka is still relatively unknown archaeologically, enough work has been done to show that there is a southern group of cultural complexes and a northwestern group. The former seems to have been ancestral to Kamchadal culture and to have been oriented southward towards the culture of the Ainu and the Japanese. The latter may be ancestral to Koryak culture and is oriented towards Siberian culture in general. Some of the Kamchatka culture complexes seem to have been in existence in the eleventh century after Christ.

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Chicago Natural History Museum
Chicago, Illinois

L. L. LOUD

A. L. KROEBER

LLEWELLYN LEMONT LOUD, archaeologist and senior preparator in the University of California Museum of Anthropology, died in Oakland, September 6, 1946.

Born August 18, 1879, in Woodland, Aroostook County, Maine, of farming-stock parents of Scotch ancestry settled in Penobscot County (the name was originally McLoud), Loud graduated in the classical course of the Caribou High School at the age of twenty-two, being able to leave the parental farm for study only during the winter months. In 1901 he left home apparently never to return, and for four years wandered to the Klondike, Seattle, Bremerton, Oakland, and San Francisco, as longshoreman, woodcutter, miner, newspaper deliverer, book agent, laborer, and janitor, interspersed by some months as student at the University of Washington and the Free Methodist Seattle Seminary. From 1905–10 he was pretty steadily registered as a special student at the University of California, and at times at the Pacific School of Religion as well, supporting himself throughout by a variety of jobs, including a janitorial one at the University. Loud did not work toward a degree, but took courses chiefly in anthropology, geography, and natural history, entertaining for a while the idea of going to Africa as a missionary.

In 1911, he became associated with the University's Museum of Anthropology, where he served at various times as preparator, guard, janitor, and unofficial field archaeologist, or in combinations of these capacities, until his death; except for the interval 1926–31, during part of which he built himself a house, largely with his own hands. When the Museum was moved from San Francisco back to the Berkeley campus in 1931, Loud rejoined its staff.

His archaeological field work was mostly done between 1912 and 1916, and included excavation in Lovelock Cave in Nevada; a survey of Humboldt Bay and excavation of a precontact Wiyot site on Gunther Island; and systematic exploration of four strategic mounds in the San Francisco area: Mayfield on the bay and Halfmoon on the ocean side of San Francisco peninsula, Stege on the east shore of San Francisco Bay near Richmond, and Glencove on Carquinez Straits. In keeping with his temperament as a solitary, Loud did this work single-handed. In 1923–24 he made archaeological surveys of Tomales Bay and of the shores of Clear Lake, but without digging; and in the latter part of 1924 he joined M. R. Harrington of the Heye Museum in the second excavation of Lovelock Cave. Loud's publications report on part of these several excavations—all in the *University of California Publications in American Archaeology and Ethnology:* "Ethnogeography and Archaeology of the Wiyot Territory," Vol. 14, No. 3, pp. 221–436, 1918; "The Stege Mounds," Vol. 17, No. 6, pp. 355–62, 1924; "Lovelock Cave" (conjointly with M. R. Harrington), Vol. 25, No. 1, pp. 1–183, 1929. His results from Mayfield, Halfmoon, and Glencove remain in the Museum, undescribed. In the history of local archaeological investigations prosecuted by the University of California, Loud's work largely fills the gap between the earlier activities of Nelson, and the successive later ones of Schenck, Strong, Olson, Wedel, and Heizer. Loud's professional virtues and limitations are evident in his monographs. The two larger ones, on Humboldt Bay and Lovelock Cave, survive as fundamental contributions to the prehistory of the Pacific Coast.

Loud was a rugged individualist. He went apart, made his own way, lived alone, never married, saw no kin for forty-five years. He pursued his ideas and satisfactions undeviatingly; if need be with stubbornness. He was humble as to his attainments and personality but proud of his independence; scrupulous, strait-laced, severe upon himself, passionate for the right. In public matters he early became and remained a pure socialist; in faith, he seems to have shifted denomination with the decades; he ended a Humanist. He asked a minimum for himself, never imposed or leaned on others, minded his business, fought only where justice was involved. Like every essential solitary, he developed oddities such as meticulousness and inflexibility; but never at the expense of others, or to the detriment of his own character or impairment of his judgment on fundamentals. He paid his way through life—probably overpaid it; gave loyalty and received it; and earned the complete respect of all who knew him.

University of California
Berkeley, California
September, 1946

FACTS AND COMMENTS

TRADE MATERIALS AT SPIRO MOUND AS INDICATED BY ARTIFACTS

The archaeological site commonly referred to as Spiro is becoming more and more a topic for discussion among Mississippi Valley archaeologists. This developing interest and enthusiasm in the Spiro site has been stimulated in various ways; by examination of artifacts in private collections or in museums, by an increasing reference to Spiro materials in the literature, and through recognition of Spiro as a grandiose example of the so-called "Southern Cult"[1] complex. Although there has been considerable interest in the site, little synthesized information has been published. Only recently, Orr has presented the most definitive facts available.[2] Since the site was first looted by commercial diggers, who disposed of their finds at random, much information is unattainable. Moreover, these Spiro materials now scattered over the country represent some of the finest artifacts from the site, and although the scientific excavations by the University of Oklahoma produced a wealth of material, many of the looted artifacts remained unique. Since this is the case, it would seem that any information concerning the Spiro materials is of value. Consequently the ensuing information concerns the Spiro site relative to its exhibiting very widespread trade relationships. In fact, the trade materials represented at Spiro are probably surpassed only by the Ohio Hopewellian sites.

A consideration of the artifact assemblage from Spiro as relating to the archaeological setting presents a generalized picture of contacts and trade relationships with other cultures of the Mississippi Valley. A more critical examination of this material offers specific information concerning areas of contact and hints as to well developed trade routes. Such specific facts concerning a wide range of contacts can supplement generalized observations, and may help in explaining the exuberant development at Spiro.

The Spiro site is located along the southern bank of the Arkansas River near historic Fort Coffee in the northeastern part of Le Flore County, Oklahoma. It is roughly eight miles northeast of Spiro, Oklahoma, and eighteen miles west of Fort Smith, Arkansas. The site occupies a portion of the Braden or Fort Coffee Bottoms, and has consequently been under cultivation for many years. There are several mounds, both large and small, surrounded by scattered village areas.

The Spiro mounds have been known for some time, and during the winter of 1916–17, Joseph B. Thoburn excavated the major portion of one of the smaller mounds.[3] Incomplete excavation resulted from a property line which divided the mound into two sections, investigation having been refused by one of the owners. Thoburn reported the mound as a collapsed Caddoan earth-lodge into which some twenty-two intrusive burials had been placed. These intrusive interments Thoburn assigned to "one of the tribes of the southern division of Siouan stock."[4] Artifacts found by Thoburn in this mound seem to correlate with Orr's Middle Spiro Component[5] and include: the typical Spiro T-type stone pipe; large flint blades; pulley-shaped stone earspools; black stone beads; pearl and shell beads; copper "plates," tubes, and "spindles"; polished stone celts; small "bird-points"; and galena.

In 1933 the Spiro mounds engaged the attention of commercial diggers, who continued their haphazard exploitations of the site until 1936. Although they dug promiscuously in all of the mounds, their efforts were chiefly directed toward the Craig mound (Temple Mound). Almost all of the artifacts removed and sold by the commercial diggers came from the remaining portion of the mound Thoburn had examined in 1916, or from the Craig mound. For the most part, the items usually associated with the "Southern Cult" complex, came from the burial chamber inside the conical portion of the Craig mound. The materials removed during this period from 1933 to 1936 were sold to various individuals or museums. No accurate inventory of this material is available although some archaeologists have presented data utilizing various portions of the total material.[6]

In 1936 the University of Oklahoma began its scientific excavations at the Spiro site. The work of the University at Spiro and adjoining areas continued until 1941, and it is only through this careful research that we can properly understand the Spiro site in its historical perspective.

The Spiro site is recognized by Orr as having two foci represented: the Spiro focus overlain by a later Fort Coffee focus.[7] No evidence of historic contact is present for either manifestation. Orr further sub-divided the Spiro focus into Early, Middle, and Late Spiro components.[8] Both foci are tentatively assigned to the "Caddoan" aspect, Middle phase of the Mississippi pattern.[9]

A survey of some artifacts from the Spiro site indicates that widespread trade relationships existed.[10] Materials derived from distant places are common among Spiro mound artifact collections. Almost all of these items can be assigned, typologically at least, as paraphernalia belonging to the "Southern Cult" complex, and hence may be attributed to Orr's Middle Spiro component. Other items, not in themselves manifesting the "Southern Cult" complex, are known to have been found in the central burial chamber of the Craig mound and thus were associated with Cult objects.

MATERIALS

Flint.[11] One of the large chipped stone batons or maces from the Craig mound burial chamber is made of flint from the Mill Creek, Illinois quarries. This flint is coarse grained

[1] Waring and Holder, 1945.
[2] Orr, 1946.
[3] Thoburn, 1931.
[4] Thoburn, 1931, p. 66.
[5] Orr, 1946, pp. 237–9.
[6] Phillips, 1940; Waring and Holder, 1945; Krieger, 1945; Burnett, 1945.
[7] Orr, 1946, p. 253. [8] Orr, 1946. [9] Orr, n. d.
[10] Spiro artifacts examined and considered in preparation of this paper are in the following collections: Museum of American Indian, New York; E. R. Bondley, Marion, Ohio; C. J. Bondley, Bellecenter, Ohio; J. S. Royer, Dayton, Ohio; G. E. Pilquist, Dardanelle, Ark., and A. T. Wehrle, Newark, Ohio.
[11] The term "flint" is used in the sense suggested by Ellis, 1938.

and presents a drab-colored surface. It is opaque except along very thin edges. The color varies from tan to brown with a small proportion being lighter colored, ranging from a dirty-white to light tan. A few specimens have a mottled or speckled appearance. These quarries are located near the village of Mill Creek in Union county, southern Illinois. These deposits have been reported briefly by Phillips[12] and Holmes.[13]

Another of the batons from Spiro is made from the flint found east of Dover in Stewart county, Tennessee. This material can be easily recognized and is sometimes referred to as an indurated shale or a rhyolite by Southeastern archaeologists. This flint is quite uniform in color, being a tannish-grey with spots or mottles in darker shades. The mottling or variegation occasionally appears in bands. It has no luster and is opaque and of medium texture. Little information concerning these Stewart county flint deposits has been published.

Many of the large chipped blades are made of flint derived from quarries in the northeastern part of Kay County, Oklahoma. Much of the Spiro chipped material has been made of this Kay County flint. Some of this material is greatly varied in color, the more attractive specimens being grey or cream, banded or striped with red.

Another important flint supply for the Spiro people was the novaculite quarries near Hot Springs, Arkansas. Many of the small projectile points found at the site are made of this colorful material. The novaculite occurs in numerous colors but white predominates. It appears in many varieties of yellow, pink, red, and black. The texture varies from a very fine grain to a coarse grained material with impurities. The flint is translucent, and in many cases resembles chalcedony. The Arkansas novaculite quarries and workshops have been known for years, but published data are scanty.[14]

Webbers Falls argillite. Some artifacts made of a black argillite have been found at the Spiro site. Among these are the polished black stone beads. These beads are spherical, carefully made, highly polished, and appear in various sizes from one-quarter to one inch in diameter. Other items made of black argillite were celts. Most specimens from Spiro are elliptical in outline, round in cross section, and highly polished. The argillite can be flaked similar to a coarse type of flint, or it can be pecked with a hammerstone and ground to a smooth surface. Thoburn has located the source of the argillite in Muskogee county, Oklahoma.[15] It occurs as a ledge in the channel of the Arkansas river at a town long known as Webbers Falls. The material is quite common at sites throughout the eastern part of Oklahoma.

Crystal quartz. Crystal quartz is present at the Spiro site as finished artifacts and natural crystals. Orr reports the presence of unworked crystal quartz fragments in both the Early and Middle Spiro components.[16] Two effigy boatstones made of polished crystal quartz are known from the site, and one of these can definitely be assigned to the Early Spiro levels. Several examples of crystal quartz stemmed or notched projectile points have also been observed.

These quart specimens are probably from the vicinity of Hot Springs, Arkansas, since this is the nearest source of supply to the Spiro site. Both quartz and novaculite could have been obtained from the same general locality in central Arkansas.

Galena. Irregular or ball-shaped masses of galena are common at the Spiro site. Orr reports the presence of galena nodules in all levels of the Spiro focus.[17] No finished artifacts of this material have been reported or observed, although most of the nodules indicate some degree of grinding. The proximity of the Spiro site to Joplin, Missouri, suggests that the galena was derived from that vicinity. Although no prehistoric quarries are reported, the presence of accessible galena deposits around Joplin indicates this as a probable source.

Mica. Mica fragments have been found at the Spiro site, and Orr reports them from the Middle Spiro component.[18] Although mica quarries in North Carolina have been known for some time,[19] these seem questionable as a source for the material. Holmes states that workable forms of mica are found in southwestern Arkansas,[20] and although it is not known to have been mined, this would be a more logical source of supply for the Spiro specimens.

Serpentine. Serpentine at Spiro is represented in the form of the handled spatula celt or "spud." No definite source for this material can be suggested, although sufficient examples occur to indicate some specific source of supply.

Hematite and limonite. Specimens of both hematite and limonite are known from Spiro. They occur as irregular beads and variously shaped small blocks and were apparently used primarily for pigments. One of the best known sources of this material is near Leslie, Missouri.[21] Whether the Spiro people obtained their material from this source or had some other supply as yet unreported is problematical.

Turquoise. Orr reports the presence of turquoise beads at the Moore component of the Fort Coffee focus.[22] The nearest known source of supply for this material is the Los Cerrillos deposit near Santa Fe, New Mexico. The presence of these beads indicates one of the more easterly located points of contact with the Southwest.

Marine shells. The Spiro site has produced an extraordinary number of the large conch shells, both plain and decorated. These shells were also used for many varieties of beads, for pendants, for gorgets, and as inlays on stone or wood. The conch shells were undoubtedly derived from some section of the Gulf of Mexico. Judging from the amount of shell materials found, a fairly large amount of traffic in these large conch shells must have existed. Although the conch shell was a favorite, there are probably other types of marine shells present at the site.

Copper. Considerable material manufactured from native copper has been removed from the Spiro site. Copper artifacts include embossed plates, ear spools, beads, long needles or bodkins, axes, and veneer plating on wood or stone. The copper was probably derived from the Lake Superior region of northern Michigan.

By way of a summary, the accompanying illustration (Fig.

[12] Phillips, W. A., 1900.
[13] Holmes, 1919, pp. 187–94.
[14] Holmes, 1919, pp. 196–200.
[15] Thoburn, 1931, p. 69.
[16] Orr, 1946, pp. 235, 239.
[17] Orr, 1946, p. 239.
[18] Orr, 1946, p. 239.
[19] Holmes, 1919, pp. 241–52.
[20] Holmes, 1919, p. 241.
[21] Holmes, 1919, pp. 266–70.
[22] Orr, 1946, p. 242.

FIG. 52. Map illustrating the points of origin for trade materials found at the Spiro site.

52) depicts the Spiro site together with localities from which Spiro trade materials originated.

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ROBERT E. BELL
Department of Anthropology
University of Chicago
Chicago, Illinois
August, 1946

ADDITIONAL EVIDENCE OF WHEELED TOYS IN MEXICO

Two recent articles[1] have pointed out the use of wheeled toys in pre-Spanish times in Mexico. Evidence points to ceramic wheeled toys having been used in several localities in that country. Ekholm found them at Panuco, Vera Cruz; Staub collected one just south of Panuco; Drucker describes several from Tres Zapotes, Vera Cruz; Charnay dug up some at Tenenepango, southeast of Mexico City;

[1] Alfonso Caso *et al.*, "Conocieron la rueda los indígenas mesoamericanos?," *Cuadernos Americanos*, Vol. 25, No. 1, Mexico, D. F., 1946; Gordon F. Ekholm, "Wheeled Toys in Mexico," AMERICAN ANTIQUITY, Vol. 11, No. 4, 1946.

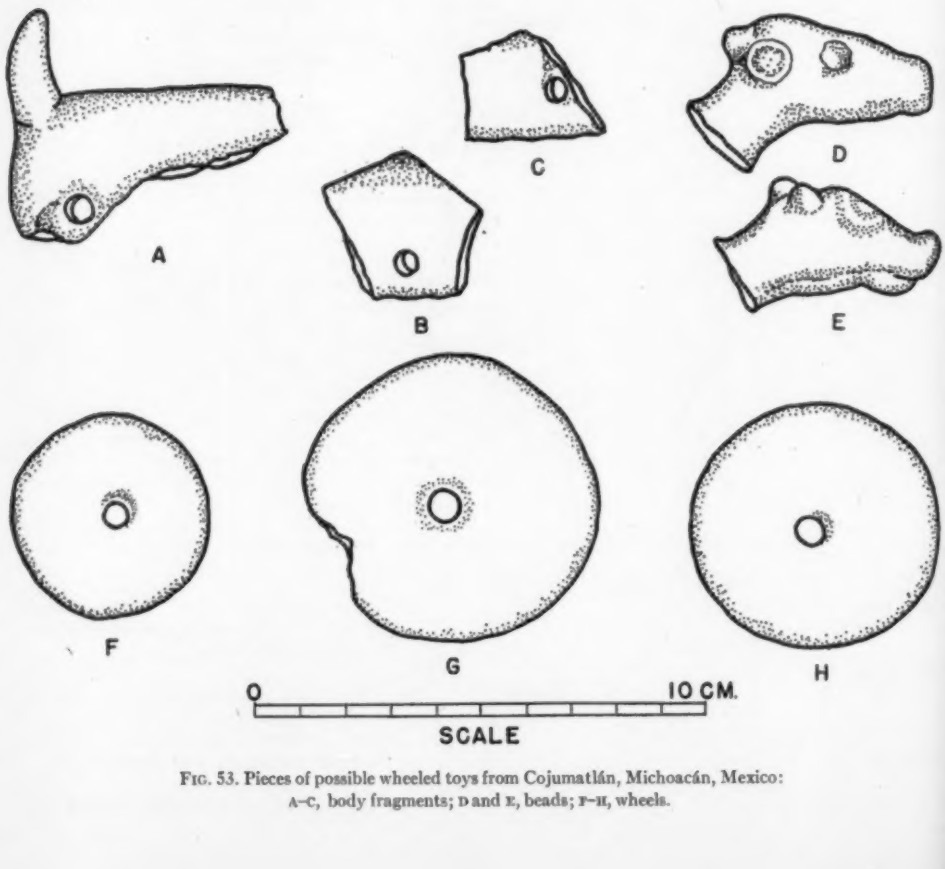

FIG. 53. Pieces of possible wheeled toys from Cojumatlán, Michoacán, Mexico: A–C, body fragments; D and E, beads; F–H, wheels.

and one was obtained by Saville in the "valley of Oaxaca." According to Caso, copper animals with legs perforated as for an axle probably came from Panama. Lothrop identifies copper animals with holes in their feet as similar to types from Coclé.

Just prior to the war, in 1941, the University of New Mexico excavated a site at Cojumatlán, Michoacán, on the southeastern shore of Lake Chapala. The material recovered from that site is now being studied preparatory to presenting a report on the excavation.

In going over the sherd material from two trenches that were dug at the site, a number of pieces of pottery were noted that may have been parts of wheeled toys. Unfortunately no whole specimens were recovered. Several pieces of hollow animal effigy bodies were found. Three of these have holes through them. The best specimen (Fig. 53, A) represents the hind quarters of a dog-like animal. It has no legs but has a hole through the lower part of the body through which an axle could have been placed.

Five dog heads of clay were collected (Fig. 53, D, E). These are the correct size to have been used on the bodies just described. Ceramically, several heads and body sherds were made of the same material.

Nine circular discs, or wheels, were found in the excavations (Fig. 53, F–H). These are not worked sherds but were definitely made in a wheel shape. They have a hole in the center, made while the clay was still damp. These discs are entirely different from the spindle whorls common to Cojumatlán.

If these fragments can be pieced together, one may picture a small legless clay dog resting on four wheels attached to axles extending through the front and hind quarters of the body. Typologically, this toy differs from those already reported. The principal differences are that it has neither legs nor tubular shafts through which the wooden axle could extend.

If this evidence is sufficient to indicate the presence of wheeled toys at Cojumatlán, it will add considerably to an already fairly extensive distribution of the trait. The dating of the Cojumatlán site must wait until a more complete study of the items of material culture and comparisons of material from other areas has been completed. A detailed report on the excavation will be forthcoming soon.

ROBERT H. LISTER
University of New Mexico
Albuquerque, New Mexico
August, 1946

REPLY TO BENNETT

In a recent issue of this journal,[1] John Bennett has discussed at considerable length two markedly divergent trends which he sees developing in archaeological work in the eastern United States. One of these he labels "empiricism"; the other, "experimentalism." The "empiricists," it appears, include those who insist on *proof*, who confuse "fact" with "artifact," and whose sins of omission and commission are inherent in their methodology. The "experimentalists," on the other hand, ask only *verification*, not *proof*; "facts" are subordinated to "problems"; traits and archaeological facts are manipulated "in the light of hypotheses"; and their errors result from misuse by inept disciples of a basically sounder methodology. Since most archaeologists, according to Bennett, use both approaches, the validity of categorizing archaeologists as either "empiricists" or "experimentalists" may be called in question, I suspect that Bennett's distinctions are largely the figments of a dialectician's imagination—a convenient creation necessary to the development of his arguments. Certain it is that in characterizing my position as representative of the so-called empiricists, Bennett's paraphrase rather obviously misrepresents my "more or less orthodox formulation of this point of view."

Of more concern than the dubious separation of archaeologists into "empiricists" and "experimentalists" are several pronouncements by Bennett regarding chronology and ethnohistorical reconstructions. In these matters his views and mine evidently diverge widely; and since his remarks seem intended as justification for a sort of speculative archaeology I regard as unscientific and uncritical, a few comments are in order.

In the first place as regards chronology I have no quarrel with the observation that the mere expression of a date in terms of numerical year-symbols does not verify it, or make it any more probable than a "carefully-developed ethnohistorical or comparative-archaeological 'guess-date.' " At the same time, I cannot see that absence of a demonstrated absolute (tree-ring or other) chronology compels us to accept "as reliable and, to a degree, verifiable" an alternative chronology based on inferences from undisclosed evidence. Such an alternative chronology may or may not be reliable, depending entire on the evidence supporting it. I see no reason whatever for accepting it as "to a degree, verifiable" merely because there is nothing better, or because someone says there *is* research behind it. If there is proof, or in "experimentalist" parlance, verification, for the dates proposed, that verification should be set forth no less than the date-symbols themselves. As for the "comparative methods" and the "carefully built-up and critically handled inferential materials" on which the "experimentalists" rely, according to Bennett, his demonstration of their applicability to site dating raises more doubts than hope in my mind:

"Thus by comparative methods we can 'date' a Middle Mississippi site as *'early 15th century,'* and give this arbitrary date-symbols, *say 1600–1650.*" [Quotation from Bennett; italics mine.]

In the matter of ethnohistorical reconstruction, the "experimentalist" viewpoint seems to me particularly open to suspicion. The nebulous "empiricist" with whom Bennett tilts may or may not be the stickler for *all* facts that Bennett makes him appear. But as I see it, he would certainly be less vulnerable than the "experimentalist" who assumes that in any particular case the facts supporting an ethnohistorical identifica ion "cannot ever" be obtained. "Cannot ever" is a long long time, and the "experimentalist" who takes this view as justification for speculation on his particular problem may justly be asked to say why he is so sure that verifiable facts will never be forthcoming. What looks impossible today may be perfectly apparent with

[1] AMERICAN ANTIQUITY, Vol. 11, No. 3, p. 198, January, 1946.

tomorrow's new evidence; and speculation based on an assumption of perpetual lack of evidence, even if euphemistically described as "inferential comparative ascription," does *not* have to be "accepted as probable." This stand on Bennett's part, if I have correctly interpreted his remarks, merely helps to confirm my uneasy feeling that all too often the "experimentalists" choose the easy way out, preferring speculation to a diligent and continuing search for relevant evidence.

Concerning the ethnohistorical equation of Oneota sites with Siouan peoples, I question Bennett's assertion that "the identification of a very few sites makes the whole inferential [Oneota-Siouan] relationship highly probable." This dictum disregards the fact that Oneota at the moment means different things to different people; and also the ethnographic truism that material culture and language are not always or necessarily coterminous. And even if certain Oneota complexes in Wisconsin, Iowa, and Missouri have been identified with reasonable certainty as Winnebago, Iowa, and Osage, I disagree with Bennett's implication that therefore the Quapaw, for example, must have been Oneota because they too spoke a Siouan language. Perhaps they were, but I think we are justified in asking for a recital of the supporting evidence; if there is none, then hypothesis has neither proved nor verified anything, and we would do better to wait for such evidence.

If Bennett's remarks are in any way a defense of the highly speculative paper at which my criticisms were directed, it should be noted that they answer none of my specific strictures. To one of my major points, that dates, reconstructions, and interpretations are being propounded by more and more workers without setting forth the supporting evidence, he offers no satisfactory answer. Moreover, if the paper in question exemplifies the "experimentalist" approach—it was certainly not "empiricistic"—I cannot regard "experimentalism" as holding out any great hope for the future. That I do not condemn synthesis or interpretative reconstruction *per se* is, or should have been, perfectly clear from my remarks. But I insist again that hypotheses, if they are to be "the life-blood of any science" must represent an honest effort and must accord with whatever evidence—or verification—is available. Anything less than that looks suspiciously like a sell-out to expediency.

Bennett sees the present controversy as revolving around "the meanings, and correlated methods, of such terms as 'trait,' 'history,' 'type,' *et al.*," which he says the "experimentalist" views as relative, the "empiricist" as absolute. I see it rather as a basic question of the degree to which archaeology shall relax its standards of observation, verification, and interpretation, and thereby depart from the scientific method. In short, with respect to "the newer interest in process, hypothesis, and theory," as exemplified by Bennett and others, I remain to be convinced (1) that much of the self-styled experimentalists' "manipulation of traits and archaeological facts in the light of hypotheses" is not actually a case of playing fast and loose with the evidence, and (2) that much of the so-called "hypothesis" to which we have been subjected in the recent literature is anything other than ill-disguised and ill-founded speculation.

WALDO R. WEDEL
U. S. National Museum
Washington, D. C.
June, 1946

NOTES ON LITTLE PECAN ISLAND, LOUISIANA

On May 25, 1946 Mrs. Wauchope and I were the guests of Mr. and Mrs. M. L. Vincent, Jr., of Lake Charles, Louisiana, on a picnic to Little Pecan Island in southwest Louisiana. During the day, we made a small excavation to sample a ridge which had previously yielded some human bones and fragments of pottery.

About five miles of marsh separate Little Pecan Island from Grand Chenier Ridge, not far from the town of Grand Chenier (Fig. 54). The waters of Little Pecan Lake wash its north and east shores. The island is about three miles long and is nowhere over 500 yards in width. At the point we tested, it is only 65 feet wide. Several prominent eminences on the island are undoubtedly Indian mounds. Potsherds, chipped stone, and fragments of both human and animal bones appear on the surface, particularly along the lake shore side.

A long narrow flat-topped ridge, consisting chiefly of small freshwater shells, forms the backbone of the island at the point we chose to sample. It reaches a height of 4.5 feet above the lake. The ridge is evidently pocketed with numerous Indian graves. Mr. J. A. Bonham told me that he had uncovered bones at practically any point he chose to sample. In our very small excavation we ran into six burials, four of them adjacent to each other and in places overlapping. I cleared one entire skeleton and parts of three others which appeared in the course of this work. Mr. Bonham, digging only a few feet away, found an isolated calvarium and cleared the leg bones of another burial near it. We recorded the burials and refilled the graves, leaving the bones *in situ* and removing only the potsherds which appeared in the grave fill.

We could follow the outlines of the graves very easily, since the Indians had dug them out of the compact mass of small white shells and had then filled the pits with a darker mixture of earth and shell. The uppermost parts of the burials were within 14 to 18 inches of the surface (Fig. 55).

All six burials were flexed. The one I completely exposed lay on its left side, facing the lake on the northeast, head toward the northwest. Its arms were flexed, with the hands directly in front of the face. An adjacent burial, of which I cleared only the legs, lay apparently on its right side, facing west, with the head probably toward the northeast or east. The third burial in the group was also flexed, but in a more upright position, like a bundle burial, interred in a vertical position.

Since we did not remove the skeleton, we could not examine it closely enough to determine age and sex with exactness. The third right lower molar was present; judging from this, and the facts that the teeth were not worn to any extent, and, as well as one could judge, the coronal suture showed little signs of obliteration, I expect it was the skele-

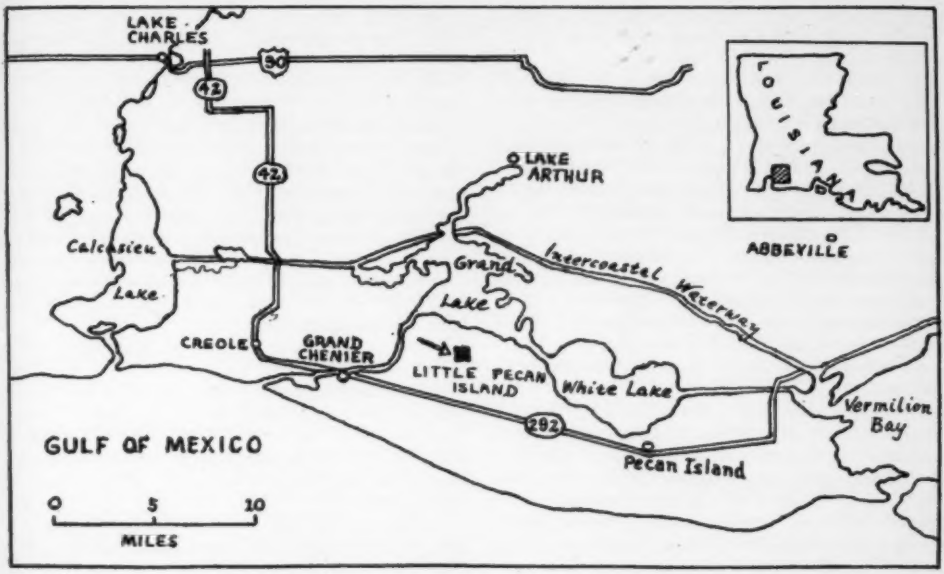

FIG. 54. Map of the vicinity of Little Pecan Island, Louisiana, showing the site investigated.

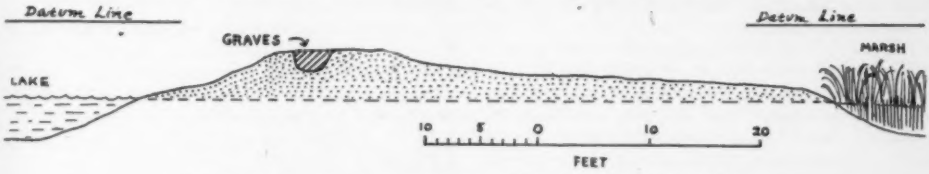

FIG. 55. Cross section through the site of Little Pecan Island, Louisiana.

ton of a young adult. The pelvis had entirely disappeared, but the contours of the skull and general size of the long bones suggest that they were female. Remains of an infant burial lay immediately behind this burial.

One of the potsherds (Fig. 56, A) found in the grave fill is a type which Ford has assigned to the Caddo Complex in northwest Louisiana.[1] The curvilinear motif is outlined by shallow grooves and filled with scratched cross hatchure. Our specimen is not sufficiently large to indicate the shape of the vessel, but this decoration type occurs on bottles,[2] bowls of either simple or composite silhouette,[3] and short-necked jars with globular bodies.[4] Like some of Ford's and Moore's comparable material, the Little Pecan Island potsherd has a salmon-colored paste; it is fired to a buff tone on the surface (exterior). I find no shell temper, although the surface is pocked in three places.

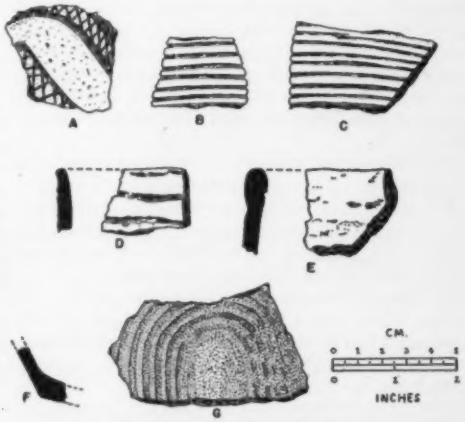

FIG. 56. Potsherds from the site on Little Pecan Island, Louisiana.

[1] Ford, 1936, p. 82 (Type 41; 21/28; 2) and Figs. 16 c, 20 r, 26 j.
[2] Moore, 1909, Figs. 13, 16, 17, 20, 21, 71, 73, 84, 100–102, 131, 136, 138, 144, and Pl. vii. Also Moore, 1913, Fig. 22.
[3] Moore, 1909, Figs. 29–38, 41–54, 150, and Pl. v.
[4] *Ibid.*, Figs. 153, 156, 164.

The specimens recorded by Ford come from the Wilkinson Plantation, Hayne's Bluff, and Angola Farm, all in the Red River drainage north of Natchitoches. Moore's material is chiefly from the Ouachita Valley. Ford assigns the type to the Caddo Complex on the basis of the fact that it had been found at sites known to have been occupied in historic times by the Caddo or located within the Caddo area. I believe that Little Pecan Island lies in the area occupied historically by Attakapan groups. I am not sufficiently familiar with southwest Louisiana pottery to say whether the type is unusual or common in this part of the state. It may be a trade piece, but it seems equally possible that this ware, like that of certain historic and proto-historic pottery of the Southeast, was made by more than one linguistic group. At any rate, the occurrence of this ware at Little Pecan Island suggests that the burials we uncovered are relatively late, since it is found at sites occupied by Indians in the northwest around 1700.

Two other potsherds (Fig. 56, B, C) from the grave fill are of a type assigned by Ford to the Coles Creek Complex, a group of material culture elements in general earlier than the Caddo Complex, but overlapping with it at some sites.[6] He states that Coles Creek is entirely prehistoric, but he believes it likely, on the basis of surface collections, that at one time Coles Creek existed in its geographical area alongside both the Caddo and Tunica, but not the Natchez or Choctaw.[6] Presumably this overlapping occurred in late prehistoric or protohistoric times: prior to 1700 but subsequent to the Deasonville Complex, which is known to antedate both Caddo and Tunica.

The two Little Pecan Island potsherds are not rim fragments. Their decoration consists of a series of parallel and horizontal incised lines or grooves about 1 mm. wide. In a few places one can see where the artist interrupted his stroke, then took it up again, or where a continuous stroke met its beginning point slightly out of line. The paste is gray, the surface buff or salmon-pink. Ford shows comparable Coles Creek material from the Peck Site, Harrison Bayou, Smith Creek, Chevalier Plantation, Hudson Place, and Gorum Plantation.[7] He stresses the overhanging or "shingle" arrangement of the incised lines, which is not pronounced in the Little Pecan Island specimens. A decoration identical with ours appears on the upper walls of a pear-shaped vase from the Mayes Mound, illustrated by Moore.[8]

A fourth potsherd (Fig. 56, D) from the grave fill is a rim fragment from a vessel with vertical upper wall. Two carelessly incised horizontal lines, 1 cm. apart, appear below the rim. They were incised before the vessel was completely dry and when it was probably not even "leather hard." The rim, too, was squared up before the vessel dried. The paste is reddish, fired to a dark gray color at the surface. Among the potsherds illustrated by Ford, the three specimens which most closely resemble it are from Wilzone Plantation and Smith Creek.[9] He assigns all three to the Coles Creek Complex.

One body sherd with stamped curvilinear decoration (Fig. 56, G) also appeared in the grave fill. The potter applied the paddle very lightly, or possibly the potsherd is badly weathered, for the design is very dim. In general, this specimen resembles stamped ware found throughout the Southeast. Its careless execution is particularly reminiscent of much stamped pottery in north Georgia, in contrast to the more clearly paddled Lamar pottery of the Piedmont and south. The paste is reddish salmon in color. Ford lists this type as an "unrelated" one in Louisiana; that is, it has not been found associated consistently with any one complex. In the Southeast, the type is usually late prehistoric; it antedates Ocmulgee Fields pottery in Georgia, for example, but probably persists (at least in north Georgia) to historic or protohistoric times.

A sixth potsherd from the grave fill is an undecorated rim fragment (Fig. 56, E). Its profile resembles the Coles Creek profiles illustrated by Ford more than the Caddo profiles.[10] The paste is salmon pink, but the surface is gray. A seventh sherd (Fig. 56, F) is from the base of a vessel where the heavy lower walls begin at an angle of slightly over 45 degrees. The paste and surface are both salmon pink in color.

Judging from this small sample of pottery it seems likely that the Little Pecan Island burials belong to the Coles Creek complex, chronologically near the end of Ford's Period II, when Caddo complex material was first appearing. Presumably this was at a relatively late prehistoric or protohistoric date, prior to 1700 and corresponding to the end of Ford and Willey's Temple Mound I stage or to the beginnings of Temple Mound II. More extensive excavations at Little Pecan Island would probably clear up a number of doubtful points regarding the geographical extent of both complexes, the relationships between them, and the general pattern of southwest Louisiana antiquities.

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ROBERT WAUCHOPE
Middle American Research Institute
Tulane University of Louisiana
New Orleans, Louisiana
June, 1946

[6] Ford, 1935, p. 3 and Fig. 2; Ford, 1936, pp. 254, 258, 271, Fig. 50

[6] Ford, 1936, pp. 172, 254.

[7] Ford, 1935, Pl. iii; Ford, 1936, Figs. 18 p; 34 a–b; 36 a, c, n; 38 a, d; 39 a, b.

[8] Moore, 1913, Fig. 13.

[9] Ford, 1936, Figs. 30 k, l; 34 g.

[10] Ford, 1936, Fig. 33.

BOOK REVIEWS

Excavations at Culiacán, Sinaloa. ISABEL KELLY. Ibero-Americana, No. 25. Berkeley and Los Angeles: University of California, 1945. vi+234 pages, 17 plates, 77 figures, tables, 1 map.

The Archaeology of the Autlán-Tuxcacuesco Area of Jalisco, I: The Autlán Zone. ISABEL KELLY. Ibero-Americana, No. 26. Berkeley and Los Angeles: University of California, 1945. xii+98 pages, 4 plates, 31 figures, tables, 3 maps.

The first of these papers is Dr. Kelly's long-awaited monograph on Culiacán, and with its appearance all of the major field work done in the state of Sinaloa has been published. The knowledge we now have about the prehistory of that state is indeed fairly impressive and is due largely to the program of research initiated by the University of California. We have the historical, geographical, and general archaeological studies of Sauer, Brand, and Beals, and three detailed excavation studies on sites in the south, central, and northern portions of the state. These latter are Dr. Kelly's study of Chametla, the present study of sites near Culiacán, and the excavations at Guasave made and published by the author of this review, the last being the only work not sponsored by the University of California. We are far from knowing all there is to be learned about the archaeology of Sinaloa, but certainly we know it in much greater detail—relative to what there is to know—than we do of almost any other state in the Mexican Republic. In fact, much of the real significance of the Sinaloa data will become apparent only when we know as much about the archaeology of the surrounding states to the south and east. The Sinaloa cultures belong definitely to Middle America, and the solution of many problems concerning their relationships to the great centers of that area must await some knowledge of the country in between.

Dr. Kelly's work at Culiacán, done during 1935 and with brief supplementary work in 1939, consisted of a series of excavations at a number of sites along the Culiacán River below the city of Culiacán, and surface surveys in the surrounding region. The principal features on the sites were low refuse mounds not ideally suited to stratigraphic analysis, but which Dr. Kelly used to the best advantage in establishing a ceramic sequence of four periods. These periods are named from the earliest to the latest as follows: Early Culiacán II (Aztatlán Complex), Early Culiacán I, Middle Culiacán, and Late Culiacán. The Aztatlán Complex is shown to have been contemporary with the mound material from Guasave and with Late Chametla II and thus to have been widespread throughout Sinaloa, while the cultures of the last three periods were a more local development. Through a nice summary of the historically documented culture found in the Culiacán Valley by Guzman in 1530, plus certain archaeological evidence, it is postulated that Late Culiacán existed to that time.

A large portion of the volume consists of a beautifully detailed and illustrated description and analysis of the Culiacán pottery, particularly of its painted designs. Other kinds of objects dealt with include clay seals, whistles, figurines, smoking pipes, and spindle whorls, and various manufactures of bone, shell, metal, and stone. Only very meager architectural remains were discovered, a fragment of a floor containing post holes.

Three appendices complete the volume. The first consists of a list of all the sites discovered in the surface survey of the Culiacán region, with a brief description and commentary on each one. Appendix II, "Examination of Copper Objects from Culiacán," by B. H. McLeod, is an important contribution to the study of American metallurgy. Through microscopic examination of certain specimens of hammered copper wire and of cast copper bells from Culiacán, Dr. McLeod has shown that the metals used in the two types of manufacture are chemically distinct, the first containing oxide and the second sulphide. He points out that this seems to indicate a fairly profound knowledge of metallurgy, for these compositions are each best suited to the technique of manufacture used. Appendix III is a highly competent analysis of the burials and the skeletal material by F. S. Hulse, who assisted Dr. Kelly in 1935. The skeletons of the 252 burials discovered were very badly preserved, but data of considerable value were obtained through having a physical anthropologist handle the skeletons in the ground.

I am quite disinclined to point out what I feel are minor defects in a study so generally well executed and of such great importance to West Mexican archaeology. I must say, however, that I cannot understand the use of the non-conventional numbering of the two phases of Early Culiacán from top to bottom; *i.e.*, the earliest phase is labeled II and the later phase, I. Perhaps such a system can be logically defended, but, to my mind, it makes reading and remembering the sequence annoyingly difficult. There is also some confusion as to just what is meant by Culiacán culture. In some cases it is obviously meant as referring to only the last three phases (p. 109) and in others to include the Aztatlán Complex as well (p. 6). Finally, there would appear to be somewhat too great an implied emphasis on the uniqueness of Culiacán culture. As a single example of this, there is the labeling of the stepped-grecque motif as merely the *saw* element without any reference to its wide distribution in Middle America.

The second paper under review is an archaeological-historical study of the Autlán Valley, a relatively small area in southern Jalisco. It is the first of a two-part work, or, in effect, the first half of a single study, the as yet unpublished second half to deal with the Tuxcacuesco area adjoining the Autlán Valley on the east and to summarize the area as a whole.

The field work on which the Autlán portion of the study is based consisted of a surface survey of the sites in the valley. No excavations were made, so it is primarily sherd material that is treated. This pottery is analyzed in detail, resulting in a separation into three pottery complexes, the Autlán, Mylpa, and Cofradía, to one of which each site is assigned.

In conjunction with this ceramic study Dr. Kelly has

examined and analyzed several sixteenth century documents which describe the settlements in the Autlán Valley at that time in considerable detail, allowing her to identify a number of her archaeological sites. Only the sites of the Autlán and Mylpa complexes can be so identified, however, indicating that those pottery complexes were in existence at the time of their being first visited by Europeans. Cofradía complex sites do not fit any of the descriptions, so it is concluded that that complex preceded the other two. This tying together of archaeological and historical data is very nicely done and is a good example of a kind of study which might eventually be attempted in many other parts of Mexico to weld securely the upper portions of our archaeological sequences to the written history of the succeeding periods.

The first part of the Autlán-Tuxcacuesco study is basic material of the utmost importance, but we must obviously await the remainder to understand its full significance. As it stands, the Autlán Valley is discussed as an isolated unit with few pointers as to how its cultures may have been related to those in other portions of Mexico. The larger problems are not discussed, but it is this and other studies of a similar kind which Dr. Kelly has in preparation, that will eventually bring order out of the present confusion in the prehistory of western Mexico.

GORDON F. EKHOLM
The American Museum of Natural History
New York, N. Y.

Archaeological Investigations in El Salvador. JOHN M. LONGYEAR, III, with an appendix by STANLEY H. BOGGS. Memoirs of the Peabody Museum of Archaeology and Ethnology, Harvard University, Vol. IX, No. 2. Cambridge, Massachusetts, 1944.

This *Memoir* is the outcome of an expedition to El Salvador, conducted by the author from September, 1941, to April, 1942. The investigations were carried out under the auspices of the Institute of Andean Research, with funds supplied by the Office of the Co-ordinator of Inter-American Affairs. It embodies the findings of a full season of survey, excavation, and study of private collections, and it includes a summary of previous research in the field of Salvadoran archaeology.

After outlining the physical aspects of the Republic, the historical and linguistic background of eastern El Salvador and summarizing the previous archaeological work, Longyear points out the archaeological problems existent in this area. In this latter section he states that "until the general set-up of Salvadoran archaeology becomes clearer, and the relations of the various cultures to one another are determined, the intensive excavation of large single sites does not appear advisable, since we can neither appreciate nor capitalize on the results of such work." In the experience of archaeologists working in the neighboring republic of Guatemala quite the reverse has been true. It has been through the intensive excavation at such sites as Kaminaljuyu and Uaxactun that much of the archaeology of other sections of the country has been clarified. These intensive digs tend to serve as reference libraries for later finds.

Part II of the *Memoir* deals with the archaeological reconnaissance of El Salvador. Longyear accomplished this study with the aid of Stanley H. Boggs. Boggs covered the central and western sections of the Republic, whereas Longyear concentrated on the trans-Lempa region or eastern El Salvador. The material is presented alphabetically, by departments of the Republic. Part II offers by no means a complete coverage of the country, but it does record most of the known data up to the summer of 1942. Mounds, pottery, and artifacts are carefully listed wherever encountered. Much of the pottery and stone material was located in private collections and there studied.

Part III is concerned with the author's field excavation. He selected the previously little known site of Los Llanitos in the department of San Miguel, just north of the Río Grande de San Miguel. Six weeks were devoted to actual digging, which included the partial excavation of a ball court and three other mounds out of a total of twelve. The most important architectural unit uncovered was the ball court which has end zones, a rectangular playing alley with ramps rising from either side, topped by vertical walls. There was no evidence of markers or built-up floors of either mortar or stone. The other three mounds add but little information architecturally. The construction encountered throughout consisted of walls of roughly squared pumice blocks set in a mortar of wet adobe. These walls contain a fill of brown, clay-like soil mixed with cultural material. The artifacts appear to have been rather scarce at this site; they include stone metates and manos, pottery spindle whorls, and obsidian blades and points. The author feels that the pottery as well as the architectural evidence indicate a one-period site. The ceramic material was reasonably abundant and except for a few wares was of local origin so far unidentifiable elsewhere. The trade wares for the most part find their counterparts in the Ulua Valley-Lake Yojoa region of Honduras, Tazumal in western Salvador, and Copan in western Honduras. In time Longyear places the occupation of Los Llanitos in a period approximately contemporaneous with the Acropolis Phase at Copan (9.8.0.0.0 —853 A.D. to 9.18.0.0.0—1060 A.D.).

Appendix C covers the excavations done by Boggs in central and western El Salvador. This includes two sites, Tula in the Department of La Libertad, and Tazumal in the Department of Santa Ana. The dig at Tula consisted of two small mounds which contained pottery of a single cultural horizon, the Copan Acropolis Phase. The excavation at Tazumal was quite extensive and has continued since this *Memoir* was published. The site boasts thirteen mounds including a ball court. One stela with possible hieroglyphs was encountered and two other large stones, one a stylized jaguar head and the other a monolith known as the "Couchant Jaguar." The stone artifacts recovered, including manos, metates, and pestles, were few in number. Boggs has divided the pottery into two main phases. The Early Phase he designates as equivalent to that of the Esperanza Period at Kaminaljuyu, and the Later Phase he finds to contain a mixture of Copan Acropolis Phase and the Uaxactun Tepeu Phase, plus later manifestations such as Plumbate and Nicoya polychrome fragments. The writer finds that there are many architectural similarities between Tazumal and Campana-San Andres as well as

Kaminaljuyu. These similarities do not include the core construction which at Tazumal was adobe with cement-like mortar forming facing for walls and floors.

This *Memoir* fills a much needed gap in the knowledge of Salvadoran archaeology. It is well presented and documented with the exception of Part II, where it would seem desirable to have been more explicit as to pottery types in connection with the different sites. The report is well illustrated and contains a good bibliography, a map of El Salvador, and a list of sites.

Since the writing of the *Memoir* further data with regard to Campana-San Andreas, Tazumal, and El Cerro del Zapote have been made available through a series of publications by Stanley H. Boggs:

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1944. "A Preconquest Tomb on the Cerro del Zapote, El Salvador." *Notes on Middle American Archaeology and Ethnology*, Vol. 2, No. 32. Cambridge: Carnegie Institution of Washington.

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1945. "Informe sobre la tercera temporada de excavaciones en las ruinas de Tazumal." *Tzumpame*, Año 5, No. 4. San Salvador.

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ROBERT E. SMITH
Carnegie Institution
Guatemala, C. A.

Hiwassee Island, T. M. N. LEWIS AND MADELINE KNEBERG. Knoxville: University of Tennessee Press, 1946. 188 pages, 118 plates, 5 maps, 32 text figures, 35 tables.

This volume sets the pace for a series of eight reports dealing with the entire University of Tennessee-Tennessee Valley Authority program of investigation in the Chickamauga Basin of the Tennessee River. Hiwassee Island lies in the Tennessee River at the mouth of Hiwassee River. It was chosen as the subject of the first report because of its key magnitude and stratified content. The report amply justifies the choice. This final report of twenty-four months of continuous excavation is, the authors tell us, a medley of cooperation. Funds from Tennessee Valley Authority, Works Progress Administration, University of Tennessee, American Philosophical Society, and National Research Council were expended during excavation and the subsequent laboratory work. Expensively printed by the University of Tennessee Press, the book itself is in many ways the cultural heir of the trend-setting Irene report. Easily read type, two columns to the page, and the 190 plates, figures, and charts, make the book a delight to handle and use. Photographs are of excellent quality and beautifully reproduced.

The publication furnishes carefully sorted, well interpreted data for one site in that critical segment of the Tennessee River from Chattanooga to Knoxville. Analyzed with constant reference to the work of Webb and his associates in other parts of the Tennessee River, the Hiwassee Island data corroborate and amplify many of Webb's speculations. In fact all previous Southeastern data are lent fuller significance by the careful comparative work of this volume. That this is true should come as no surprise. Students are often criticized for allowing many years to elapse between excavation of sites and the publication of the report. Such delay, we piously hope, implies that analysis is proceeding carefully, incorporating all appropriate published material made available during the delay. We are, therefore, justified in expecting any long delayed report to excel. In the case of *Hiwassee Island*, we are not disappointed. Among other things, the complete, detailed authenticity of the authors' reconstruction of the Indian way of life is a cogent argument favoring the exhaustive dragnetting of a site. At this one site alone according to Table I, the University of Tennessee dug twenty-one units. The units varied from large pyramidal mounds to small midden heaps.

The book is well organized. Conclusions and speculations, with some supporting evidence, are presented in the second chapter more or less as an orientation course, where even the casual reader will benefit. All data are then presented in terms of activities. Separate chapters cover community plan and subsistence, architecture, pottery and weaving, stone, bone, shell, and copper, etc. Three distinguishable prehistoric groups were recognized in addition to the historic Cherokee. These are the Hamilton, Hiwassee Island, and Dallas foci. So, each discussion by activity contains three sections, one for each focus. Segregated as an appendix are detailed trait lists which set out in tabular form the traits characterizing each focus. Terminology throughout is in terms of the currently popular mid-west classificatory system. Aspect, focus, component, and community are used to designate various levels of abstraction and synthesis.

An excellent feature of the book is the graphic summary provided by Plates 98–118, which were diplomatically included for the benefit of the non-professional reader. Prepared to guide construction of dioramas, these twenty sketches present an artist's conception of the appearance and practices of the Indians as they would have been observed by contemporaries. These sketches, breathing life and clarity into the archaeological data, appear to be accurate to the last detail. Such treatment could be overdone; it may even be overdone here in the case of physical types, but I suspect all readers will use this section with profit. Certainly the details of a Dallas burial can be more quickly learned from Plate 102 than from Plate 93A and its accompanying text.

The first twenty pages are written with admirable skill. Important as the detailed sections are, I regard the lucid summary which opens the book as its most important sec-

tion. Here the authors have set out for us the basic facts, hypotheses, and opinions about which this and subsequent reports are to be oriented. Here they give us a short account of the cultures observed in this section of Tennessee, arrange them chronologically, and give us their nearest counterparts in other sections of the south.

This important background of aboriginal history of the Tennessee Valley against which the authors display the Hiwassee Island data is worthy of brief recapitulation here. The authors recognize three aspects of the Woodland pattern. Upper Valley aspect has two distinguishable foci: Watts Bar and Candy Creek. Watts Bar focus, largely because of the presence of crushed-quartzite pottery temper and the uniform use of cord-marked decoration, is regarded as slightly older than Candy Creek focus. Candy Creek is characterized by crushed-limestone pottery temper and the use of carved-stamp decoration of pottery. Middle Valley aspect, which developed later than Candy Creek, is represented by the Hamilton focus found on Hiwassee Island. Lower Valley aspect, with no foci determined, is a variant found in the Tennessee Valley of West Tennessee. The aspect names are thus geographical; Upper Valley is applied to remains in the upper reaches and tributaries of the Tennessee River; Middle Valley occurs in the Chickamauga Basin and further downstream; whereas Lower Valley applies to material found in western Tennessee. The Middle Mississippi pattern is represented by the Hiwassee focus, the Dallas focus, and Mouse Creek focus. Of these, Hiwassee is the earliest, the latter two being contemporaries which developed from Hiwassee.

Historically, the Creek, Cherokee, and Yuchi tribes inhabited the region. The present report deals with three prehistoric and one documented historic occupation of the island. These occupations are: Hamilton focus, equating culturally (and presumably chronologically) with Late Archaic, Copena, and Adena; Hiwassee Island, the equivalent of the early Middle Mississippi "small log town house" level of Norris Basin; Dallas Island, the Hiwassee Island version of late Middle Mississippi which is identified by the authors as Creek. A thin veneer of Cherokee remains caps the chronologic structure. These identifications rest on excellent typological and comparative studies. Adequate caution is shown by the authors throughout the study in distinguishing between observed fact and interpretation or opinion.

Despite a temptation to make detailed comments on the many provocative ideas so thoroughly worked out in the first twenty pages, and interspersed throughout the chapters on activities, only some of the more important items will be cited.

On pages 7 and 8, and again on pages 84–5, the careful equating, on the basis of pottery, of Candy Creek with the strong Swift Creek of Georgia and both with Copena, tends to clinch the generally accepted conception that these three are not only culturally close kin but coeval. The suggestion that Candy Creek borrowed mound burial as well as pottery from Swift Creek seems to be forcing the evidence.

On pages 8–9 in a discussion attempting to show the probable origins of the Lower and Upper Valley aspects, the terms Woodland, Archaic, and Hopewellian are loosely used. Following Ritchie, the authors have an Archaic pattern, a Woodland pattern, and the Hopewellian phase. Such terms and such discussions obscure the fact that the cultures lumped as Woodland are but developments upon an Archaic base. When a continuous flow of cultural traits can be seen to persist from period to period, the new periods being different in the possession of new traits, but retaining many old ones, the injection of a phase, focus, or pattern, before admitting a chronological and/or genetic relationship seems to serve no purpose beyond adding to the suspense.

One of the best passages in this important second chapter is the identification of the carriers of the Middle Mississippi cultures as the great wave of Muskoghean speaking peoples who dominated the South of De Soto's day. The identification of the Dallas focus as Creek hinges upon the analysis of the Middle Mississippi Muskoghean. The idea that Middle Mississippi represented proto-Muskoghean is not new, but it is here well articulated. After careful reading of this excellent evaluation of the combined historic and archaeological data, I agree that . . . "Southwestern archaeologists should have no reluctance in accepting the equating of the middle Mississippi manifestations with the Muskoghean speaking peoples . . . ."

On pages 11–20, the authors sift the inaccurate conflicting historic accounts of the shifting tribal locations in their region after 1700. The weighing of these historic data against archaeological manifestations helps in the difficult job of evaluation. The authors' problem, of course, is the important one of equating archaeologically built up foci with historic tribes, and to find an exact or near exact date for the withdrawal of the Creek from the vicinity of Hiwassee River. This would also provide a date for the beginning of historic Cherokee occupation. Confusing to the main issue is the presence of the Yuchi in the region at a time when the Creeks were dominant. What, archaeologically, was the culture of the former? The Mouse Creek focus, closely related to the Dallas focus, is finally assigned to this historic role. Although the authors' data are diverse and their reasoning is devious, I consider the attempt to equate three archaeological complexes with three historic tribes as momentarily a success. The final score shows Dallas to have been Creek and Mouse Creek Yuchi, while Fort Louden yielded pure Cherokee material.

From pages 21 to 168 the factual data, with interpretations, are presented; these data are treated by arbitrary categories as I have said. The readers of the report will for themselves, find the many lucid, logically built up explanations of the archaeological observations. In rare instances, the authors strain a point to offer an explanation of some observed phenomenon. An example is the deduction on page 139 that the Hamilton males who wore olivella shells in their left ear "were distinguished warriors in their time." This is too much, particularly when in the next paragraph they see no "cultural significance in the fully flexed burial position" of eight burials. Pottery specialists, or students of architecture, will recognize the workman-like competence of these respective sections. The section dealing with architecture constitutes the best discussion of aboriginal wood construction yet printed, although some of the

interpretations will be questioned.

These chapters are studded with examples of careful development of minor theses. I call attention to a few of these: The authors introduce on page 40 a well balanced statement of the nature and extent of inter- and intratribal communication over the southern network of Indian trails. Also valuable is their analysis of the significance of limestone tempered pottery (p. 81). The correlation of the fine-to-coarse-to-plain sequence in the method of cord-marking pottery with the appearance of the bowl form (on page 83) is nicely done. The treatment of the significant chronological priority of fabric-marked pottery over cord-marked is good. And on page 98 a long speculation about pottery differences, etc., reminds us again how many arguments bearing on pottery could be avoided if some petrographic analysis were done in the Southeast.

The authors open a profitable avenue of search as they suggest (pages 93 and 98–9) that the Cherokee may be the authors of all complicated stamped pottery in the southeast from Swift Creek times until the nineteenth century. While this may be true the combination of fact and hypothesis is not very convincing. One flaw in their chain of speculative reasoning is the assumption that the disappearance of complicated stamped pottery in central Georgia means its desuetude over the entire south. To this I cannot agree. On the Georgia coast at Irene, for example, the tradition of carved decoration of one sort or another is unbroken from earliest times to abandonment of the site. Or at Kolomoki, where Swift Creek styles give over to Lamar types without an intervening middle Mississippi period, Weeden Island types appear but carved paddle-stamping coexisted with them. Lewis and Kneberg have regarded the displacement of the makers of carved paddle-stamped pottery by the Muskogheans, and the consequent disappearance of stamped pottery, as evidence of temporary total loss of the technique. This disappearance of the technique from some sites seems to me no more than the archaeological record of the fact that local groups withdrew in front of the intruding Muskogheans. The proto-historic reappearance of carved paddle-stamping is nothing but the reentry of a people into a region they once inhabited. More evidence that these people were always the Cherokee is needed.

In concluding the review there are a few general comments I wish to make. The authors frequently refer in their text to data recovered from some "other [Chickamauga Basin] site" which they have studied. Mention should at least have been made of a site number.

I am especially interested in the single Folsom point found, again loose in the mound fill without clear association, in a Hamilton mound. In view of Folsom point association (maybe fortuitous) with Copena, and the many Folsom pieces being reported from Central Tennessee on the Duck and Cumberland rivers and on the Lower Tennessee River, we see, in my opinion, a little more evidence that Folsom flint techniques persisted into quite recent times. The repetitious discoveries of the typical point in Copena-Adena sites and in many Archaic sites indicates mayhap that the Folsom hunter was the intruder whose impact upon the Archaic cultures of the East led to the development of the Adena-Hopewell-Copena trinity. If the origin of Adena were thus simply explained, however, we would expect to find a better technique in flint work than these cultures demonstrate.

In my opinion the whole volume is weakened by the consistent use of the terms foci, component, etc. As Phillips pointed out in his review of *An Archaeological Survey of Pickwick Basin*,[1] forcing a clear, sharp stratigraphic sequence of cultures whose distant cultural equivalents are known, and whose chronological position is amply demonstrated into the classificatory pigeon-holes is wasted effort. I regard emphasis upon the use of the trait list (which injects a pseudo objectivity into the drudgery of determining degrees of cultural likeness) as the major contribution of the classificationist. Trait listing has greatly accelerated the progress of eastern archaeology, but it is possible to use a trait list without cramming everything into foci afterward. When the sequence of cultures is established and their relationship to others of like content and age is demonstrated, the historical debt is paid. That's what archaeology is expected to do. If the authors found the concept of foci useful, its use was justified, but its repetitious use in the book constitutes a flaw.

The report profits from the wide knowledge possessed by the authors of scores of related but so far unreported sites. It is hoped that the other reports in this series will soon be available.

With this review, I have not attempted to commend all the good things, nor have I found all the items which will be questioned by readers who study it in the future. My comments will merely provide a random sample of the volume's content for those who will not use the book. Southeastern students will pore over its stimulating pages for many years.

I have found it difficult to read critically in the face of the smooth, deft style with which the authors outline their ideas. Evidence is offered in such effective and logical sequence that I find myself appreciating the skillful argument so much that my critical faculties are lulled.

My criticisms do not detract from a carefully organized, generally sound, occasionally brilliant analysis of some difficult data, upon which the authors are to be congratulated. The book takes its place with *The Adena People* and *Fort Ancient* as a publication of outstanding significance in the Southeast. To the student of American archaeology, whether professional or amateur, the book will prove indispensable.

JESSE D. JENNINGS
National Park Service
Tupelo, Mississippi

Papers of the Michigan Academy of Science, Arts, and Letters, Vol. XXX (1944), Pt. IV, General Section, pp. 457–681. Ann Arbor: The University of Michigan Press, 1945. $1.75.

Eight papers of this volume are devoted to anthropology:

The Hopewellian in the Detroit-Windsor Area. EMERSON F. GREENMAN. Pp. 457–64. 2 plates.

The Owasco aspect is represented in the Michigan-Southern Ontario area by eight sites. At two of them, the

[1] AMERICAN ANTIQUITY, Vol. 8, No. 2, 1942.

Rivière Au Vase site and Gibralter site, there have also been found artifacts associated with burials which rather definitely may be classified as Hopewellian. The author classifies Hopewellian as a phase of the Woodland pattern.

At the Rivière Au Vase site, horizontally removed from the main component, five Hopewellian burials were found, three of which were accompanied by artifacts including Woodland type vessels and a copper rod mounted in a bone handle.

The Gibralter site also revealed Hopewellian material but here the association was with burials occurring at a greater depth than the Owasco component. Whether the Hopewellian burials were precedent or intrusive could not be conclusively demonstrated. Artifacts included Woodland-like pottery vessels, copper rods, a platform pipe, and an effigy pipe.

The Woodland type pottery found at these two sites has been found in Hopewell mounds in Ohio. Greenman considers this "one of the most important links between the Hopewellian and other phases of the Woodland pattern." From the occurrence of the two Hopewellian components with Owasco components the author infers that there could have been a development from Hopewellian into Owasco. Although he cites a few examples of contributing evidence from other sites, the nature of this evidence is so tenuous and the importance of the relationship to be demonstrated is so vital, that a reasonably larger body of material must be added to the data before a definite status may be fixed.

Ceramic Collections from Two South Carolina Sites. JAMES B. GRIFFIN. Pp. 465–76. 2 plates.

Publications concerned with archaeology in South Carolina are few, hence any additional data on the area are most welcome. This paper briefly describes the potsherds recovered from the surfaces of these two sites located "near the Piedmont border of the Coastal Plain in the valleys of the Congaree and Wateree rivers."

The Thom's Creek site on the Congaree yielded 121 sherds, the majority of which "can be said to belong to the early Woodland pottery tradition in the southeast . . . ." The author defines one new pottery type, Thom's Creek Punctate, based on nineteen sherds. This again emphasizes the need for a central clearing-house for pottery types occurring in the Southeast.

The Cut-off Island site collection contained forty-two sherds. From this collection, the author suggests "that this site was occupied just before the period when the complicated-stamped was the most prominent method of surfacing the jars and bowls." This places the occupancy of the site just prior to 1500, and subsequent to early Woodland manifestations in the area.

Pottery, as surface collection material, is probably the best criterion for establishing relationships and chronology. However, it must be used with skill and caution (both exercised by the author in this paper). In the opinion of the reviewer the small size of the sherd collections precludes their being taken as representative of the site as a whole. The author makes it clear that the chronological placement of the sites is only a suggestion, but suggestions often are confused with conclusions.

A Ceramic Study of the Rivière Au Vase Site in Southeastern Michigan. VICTORIA G. HARPER. Pp. 479–91.

Here is a petrographic anlysis of samples of pottery from the site mentioned in the title and a comparison of that material with potsherds from three other sites. This study represents further use of a new aid to archaeology, an aid which should be increasingly utilized in the future. Two components were present at the site, both classified Woodland but in two different phases of that pattern.

The author has selected samples of the available clays and rock material from the Rivière Au Vase site and by petrographic study, firing, and other tests has demonstrated that the pottery was remarkably uniform within each component, and that although the two wares differed greatly, the same source material was probably used in the manufacture of both.

Upon comparison of the pottery from Rivière Au Vase with three other sites in the same general region, the author found that ceramic analysis showed all four to have similar qualities and to have been made from local materials. One of these sites was Upper Mississippi phase in classification. The fact that the source material for pottery making in southeastern Michigan is a rather uniform and widespread lake deposit renders difficult the problem of identifying trade vessels.

Restoration of Flakes on a Quartzite Implement. MARION L. HREBEK. Pp. 493–8. 1 plate.

In 1942 a field party from the University of Michigan recovered some implements from a workshop on a former beach of Lake Huron, which beach is correlated with the Wisconsin glacier front when it stood only 100 miles to the north. The artifacts from this site are water worn, yet the old beach is 297 feet above the present lake level. These facts bespeak of some antiquity for the artifacts.

Among the artifacts from the site was a quartzite blade of a rather distinctive color. Flakes of the same material were collected in the vicinity and an attempt made to replace the flakes on the blade and restore the original block. From a study of these flakes and their relative positions, the author deduces the method of manufacture to have been a process of alternate free- and step-flaking accomplished entirely by percussion.

Nutrition of Paleolithic Man. GEORGE LECHLER. Pp. 499–510.

Occasionally our knowledge of a specific phase of prehistory is enhanced by someone's gathering together the bits of information that are to be found isolated in obscure journals. The author of this paper has made a notable contribution in that wise alone, since most of the references cited are from foreign journals to which the casual reader would have little access.

Most of the sites mentioned as specifically yielding information that casts some light on the diet of early man are sites of the late Paleolithic type, especially Magdalenian. Deductions from information concerning the lake dwellers of Europe and observations among modern primitive peoples have served in further clarifying the study of the food of early man. The author asserts that

"Food collecting was more important to Old Stone Age man than hunting was." Even among the hunters of Magdalenian culture, it is believed that the "main attraction" of a reindeer was the "stomach filled with vegetables, arctic plants which would not be digestible for man without predigestion by the reindeer." In the opinion of the author, the fact that pre-man was a plant eater justifies a belief that Paleolithic men had some vegetables in their diet. Since anthropoid apes prepare and store plants for later use, it is concluded that early men must have done so too, a logical but not necessarily valid conclusion. The storing of plant leaves by apes is not in anticipation of a season of food shortage but a trait of their genetic make-up. Further, the great preoccupation of living primitive peoples with preparing food by fermentation processes, by extracting the poisonous elements, and by collecting seeds, is taken as an indication that early man must have been concerned with many of these activities.

In the concluding paragraph the author has a cogent thought which is not borne out in the main body of his article, to wit, "man of the Old Stone Age" did not deliberately set out to improve his economy by utilizing plants, but rather, "incidental observations or the desire for some stimulation activated him." These accidental and incidental increments in culture building are too often taken as the result of deliberation and far-sightedness on the part of early man.

An Indian Village in the Little Cayuse Mountains of Montana. WILLIAM MULLOY. Pp. 511–21.

In 1940 and 1941 the Montana Archaeological Survey revealed some villages and house sites of heretofore unreported type. Associated artifacts indicate their age to be early historic, although no cultural classification has been possible.

These villages and house sites are known to occur only in eastern Montana and northern Wyoming. One village, as the title indicates, is described at some length. It is located in an old talus-filled depression backed by a steep cliff on an eastward-facing escarpment above a broad valley. The village remains are three log lodges and some pictographs.

House No. 1 "was built of vertically placed poles forming a hemicone, the open side of which rested against the cliff wall." It was about seven feet in diameter. House No. 2 was similar. No. 3 was roughly square, backed against the cliff, the walls formed of cribbed logs. Rows of stone slabs were placed around the bases of the walls. Taken as an indication of historical connection for this last structure was a tree growing directly above from which there "projected the stumps of three branches that had been laboriously cut off, apparently with a metal knife."

All of the house sites observed by the Survey were either the "vertical-pole tipi-like structure" or the "horizontal-log cribbed structure." The latter have a side door and a central fireplace. Although no artifacts were found at the village in Little Cayuse Mountains others have yielded gunflints and trade beads as well as some artifacts of chipped stone and a few potsherds.

Mulloy concludes that the builders of these houses "cannot be assigned to representatives of any one tribe." The indigenous Crow made temporary shelters of the conical type and attributed a like custom to their neighbors.

It is probable that such structures must have had very short usage since so little midden material was found in or near them. The reviewer knows of no such structures in rock shelters in the eastern United States, but their absence cannot be explained because of a milder climate since somewhat similar structures have been noted in the Southwest. As the author points out, these structures cannot be taken as a trait of any one group of peoples.

The two following articles are concerned with material on which the reviewer is not qualified to comment:

Hopi Notes from Chimopovy. WILSON D. WALLIS and MISCHA TITIEV. Pp. 523–56. 20 plates.

This article contains information obtained in 1912 from a native of the Pueblo of Chimopovy. It includes data on foods, material culture, natural history, social customs, and supernaturalistic beliefs of the Hopi at Chimopovy. The twenty plates are of shield designs reproduced from watercolors executed by the informant.

Notes on the Ethnobotany of the Keres. LESLIE A. WHITE. Pp. 557–68.

The material presented was acquired by the author from Acoma and the eastern Keres. The body of the article consists of a list of plants by common name, scientific name, Ethnobotanical Laboratory catalog number, the native Indian term, and any pertinent information available.

WILLIAM G. HAAG
University of Kentucky
Lexington, Kentucky

An Early Site in Cayuga County, New York. WILLIAM A. RITCHIE. Researches and Transactions of the New York State Archaeological Association, Lewis H. Morgan Chapter, Vol. 10, No. 1. Rochester, N. Y., 1945.

In this monograph Ritchie presents further data on the Frontenac Island site, which is the type component of the Frontenac focus (aspect undetermined) of the Archaic pattern. The author covered the salient features and set forth his interpretations in his larger work, *The Pre-Iroquoian Occupations of New York State.*[1] The essay under review was awarded Honorable Mention in the A. Cressy Morrison Prize Competition in Natural Science in 1944 by the New York Academy of Sciences. It will be of particular interest to physical anthropologists, because the author presents for the first time the detailed measurements and interpretations resulting from a study of the skeletal material, which was given a cursory treatment in his previous publication. Ritchie was forced to curtail the contents of the report because of the exigencies of war-time publication. The work lacks a detailed treatment of the artifacts; the pottery of the later occupations receives but a long footnote. This is compensated for in a way by the use of tables and plates. The body of the paper consists of twenty-seven pages, but this concise summary is supplemented by one map, eight tables, one figure, and fifty-eight plates.

[1] Rochester Museum Memoir, No. 1, Rochester N. Y., 1944.

While analyzing the Frontenac material, Ritchie was confronted by a confusing mixture of traits which he interprets as evidence of successive occupations, the earliest being an instance of acculturation or, as he sometimes terms it, "contact metamorphosis." In drawing his conclusions, the author relies heavily upon the traits which he considers diagnostic of the cultures which he has defined previously for the region. This approach leaves a residuum of nonspecific traits which he cannot use. The study of the vertical distribution of the diagnostic traits reveals that the site was first used by a people whose culture was characterized by a combination of traits attributable to the Lamoka focus (aspect undetermined) of the Archaic pattern and to the Brewerton focus, Laurentian aspect of the same pattern. This hybrid manifestation is termed the Frontenac focus. The principal later occupation is identified as belonging to the Point Peninsula focus, Vine Valley aspect, Northeastern phase, Woodland pattern. Minor occupations by groups using Owasco and Iroquois pottery are also indicated.

Ritchie compares the grave goods with the mode of burial and concludes that flexed, extended, cremated, and secondary burials are characteristic of the Frontenac focus. He was assisted by Neumann in the morphological study of the skeletal material. There are three metrical and indicial groups: (1) dolichocranial, (2) mesocranial, and (3) brachycranial. These are assignable to two general types. Type 1 correlates with the dolichocranial group and is Neumann's Shell Mound type of the Sylvid race. Type 2 is provisionally of Neumann's Younge type, Sylvid race, and correlates with the brachycranial group. The mesocranial group may be a normal variant of the two established types or a hybrid result of miscegnation. The majority of Type 1 crania occurred in flexed burials with grave goods diagnostic of the Lamoka focus. Type 1 crania also occur at the Lamoka site in flexed burials. Type 2 crania correlate with extended burials containing grave goods diagnostic of the Brewerton focus. Types 1 and 2 crania were associated with extended burials and the Brewerton-Lamoka hybrid culture termed the Frontenac focus. The mesocranial group was divided among the three complexes of grave goods in a manner supporting the evidence for acculturation (Table 7). Tables are used to set forth the detailed information as to mode of burial, grave goods, and physical type, and how these correlate. Additional tables are used to present the craniometric data.

The author offers alternate hypotheses as interpretations of the data. First, the site may have been occupied by a dolichocephalic people bearing the culture of the Lamoka focus. This occupation may have been followed by a brachycephalic people of the Laurentian culture as manifested by the Brewerton focus. The second hypothesis requires the island to have been used alternately by both groups, with a consequent disturbance of the burials placed there by each. Ritchie sets forth the evidence pro and con for the above hypotheses and concludes that a third one fits the data to a greater degree. He feels that the evidence points to the Frontenac focus being produced by the acculturation of the Lamoka when they came into contact with the Brewerton people. He adds that all three hypotheses may have "some element of verity." The data seem to indicate that the dolichocephals came first and were followed by brachycephals. The proof of the symbiotic relationship between the two rests in large part upon the assumption that the mesocranial skulls are, in truth, hybrids and not normal variants of the other two physical types. The cultural evidence tends to support the theory. It is impossible to question the decision as to which traits are diagnostic in the material culture. Ritchie has labored long upon the problems of New York archaeology and is well qualified to establish those traits which are diagnostic of the cultural complexes he himself has set up.

Ritchie has handled a perplexing problem with skill. The reviewer, however, feels that it will be necessary to devote considerable study to other related sites before all the conclusions drawn from the Frontenac data may be accepted without qualification.

CARLYLE S. SMITH
Columbia University
New York, New York

Old John Neptune and Other Maine Indian Shamans. FANNIE HARDY ECKSTORM. Portland, Maine: The Southworth-Anthoensen Press, 1945. 209 pages, 10 illustrations. $5.50.

Here is another book of major proportions to add to the ethnohistorical literature on the northeast. Mrs. Eckstorm's contribution deserves a place on the top of the bookshelf between two bookends moulded in imperishable material bearing the figure of old John Neptune, the hero of her narrative. It elucidates some of the vital issues in the culture of the Penobscot Indians as recorded and illustrated in the life of Neptune. He was the dominant factor in the political picture of the period of tribal history for fifty years between the time of his birth, 1767, and his death in 1865, as inscribed upon his monument in the graveyard on Indian Island. Neptune's life is treated as a symbol of Penobscot life and thought, chiefly in emphasizing the importance of the magical man as a directive force in Indian society. His life story is told in a fluent, sympathetic, and intimate style with an utterly sincere appreciation of its qualities of strength and weakness. A large portion of the book is devoted to a review of the genealogical background of the Neptune family, the antecedents and offspring of the central figure. The treatment is analytical of his character, bringing out the fact that he exploited his reputed power as magician to hold sway over the people of his tribe, especially over his detractors. He was "one who sowed to the wind and reaped the whirlwind," causing a break in the political unity of the Penobscot that resulted in formation of two parties wrangling "in ageless conflict between conformity and initiative," and in the end the right to an education, disapproved by the Church, championed by Neptune has produced results. The social psychologist will find matter in Neptune's personal history to interpret his theories of individualism as an agency in culture.

It is not the purpose of the present review to enter into a detailed discussion of the ethnological topics treated in Mrs. Eckstorm's volume. There are, however, some well-

substantiated conclusions offered to show that the early historic populations of the coast of Maine east of Penobscot Bay were of Malecite and Passamaquoddy identity, known then as "Etchemins," who subsequently retired farther east to where the two just mentioned are now located. The author then identifies the "Tarratines" of historic note with a group of Micmac who had pressed along the Maine coast to the west as far as the bays. Her reasoning in this direction has to be well considered by ethnologists and especially by archaeologists engaged with the perplexing problems of pre- and proto-historic occupants of the Maine littoral. The wide treatment of topics having a direct bearing upon issues of varied hue that come to light in the progress of research in the area makes the book indispensable to the library of the growing coterie of students devoted to the task of straightening out the stratifications of culture being disclosed by excavation.

A great deal of traditional matter presented in something of the phraseology of Indian narrators is given in the sections dealing with shamanism. A subjective motive is shown to lurk in Penobscot life ways, in which the shaman exerted a directive influence upon social behavior. The relations put upon record are valuable additions to the meager total that we possess since so many of them are drawn from the author's reminiscences of conversations with older persons of the Neptune line now deceased. With these and the shaman anecdotes previously collected, plus what what can still be brought to knowledge from investigations planned among the extant bands of the northeast, a treatise on magical practices and beliefs as a fundamental of the Algonkian religious mind may be hoped for. Mrs. Eckstorm makes her contribution as one confined strictly to the Penobscot and Passamaquoddy. This is wise from the angle of the methodological approach. Collections of such data showing the variability of versions of shaman exploits need have no limits.

The book is indeed full of suggestiveness in the hands of the comparative ethnologist who will, when time is ripe, undertake to analyze, the elements of culture in a region fraught with problems interwoven with aboriginal properties and those arising in the course of the acculturation that has affected the tribes in question for the past several centuries.

In a most sincere and modest mood Mrs. Eckstorm has prefaced the book expressing the desire to make available to students of Maine Indian life her life-long products of experience in the sphere of Penobscot mentality augmented by those derived from her father. In a number of cases her statements are more provocative than conclusively definitive. The author's strong and positive personality pervades every section of her book; her criticism of sources, of which there is an abundance beyond the ken of the average ethnologist, is effectively sharp and severe. Taken as a whole the book is one built upon a solid background and fulfills admirably the purpose for which it was written.

F. G. Speck
University of Pennsylvania
Philadelphia, Pennsylvania

International Journal of American Linguistics. Edited by C. F. Voegelin. Published by Indiana University under the auspices of the Linguistic Society of America, the American Anthropological Association, and the Committee on American Native Languages, American Council of Learned Societies. Quarterly, $4.00 yearly.

The *International Journal of American Linguistics* was founded in 1917 by the late Franz Boas to serve as an outlet for brief publications on every phase of American Indian linguisic research. During the period from 1917 to 1939 the journal was published at irregular intervals and became an indispensable tool for scholars working in this field.

In 1942, shortly after Professor Boas' death, Indiana University took over the publication of the *Journal* under the able editorship of C. F. Voegelin. Dr. Voegelin has made no essential change in editorial policy and the seven numbers so far published (October, 1944 to April, 1946) amply demonstrate that the journal maintains the high position is attained under Boas' direction.

Since the *International Journal of American Linguistics* is devoted exclusively to linguistic research, it is to be expected that its contents will for the most part reflect the interests of linguists. Volume 11 (1945) contains over 260 pages, the bulk of which are devoted to phonemics, morphology, and lexical studies. Somewhat less space is occupied by articles on the classification of American Indian languages and dialect studies, and a still smaller amount to reviews, indices, and miscellaneous papers.

Despite this necessary specialization, however, it is to be hoped that anthropologists in other fields will not only make use of the journal but contribute to it. Even the archaeologist, whose specialty at first sight seems far removed from that of the linguist, may upon occasion find the journal helpful. Historical problems in particular require both archaeological and linguistic evidence for their solution, and it seems to this reviewer at least that a closer integration between archaeology and linguistic studies in native America is a desirable end. Both archaeologists and linguists often attempt to solve problems independently which might far more easily be solved had the evidences from both fields been brought together.

It would appear, then, that the *International Journal of American Linguistics* has two broad and equally important functions. One is the obvious purpose, to facilitate publication in the narrow field of American Indian linguistics and to provide a means of communication between the few and widely scattered scholars in this field. The second is to provide authoritative data on American Indian languages to other anthropologists in an intelligible and useful form, and so to stimulate discussion from them on the problems common to all fields of anthropology.

Harry Hoijer
University of California
Los Angeles, California

NOTES AND NEWS

ARCTIC AREA

L. J. Giddings, Jr. spent the summer of 1946 collecting tree-ring data in the Arctic. Beginning at Fort Nelson, he and Mrs. Giddings floated down to the mouth of the Mackenzie in a skiff, taking samples of trees at about 20-mile intervals. On the upper river tree growth was found to be rapid and most of the spruces were less than 150 years old. At the delta, however, several 500 to 600 year old spruces were found which gave an excellent climatic record. From the Mackenzie it was planned to proceed up the Arctic coast to Barrow:

"At Aklavik we installed an inboard motor in the 27-foot skiff and started out for Barrow. But the season continued against us. Winds blew almost continuously from the west and the ice stayed just offshore. We were never able to remain on the water for more than four hours at a stretch, and ended each attempt by racing to shore against wind and ice. Were icebound three days at King Point, where Amundsen wintered, and again for a while at the mouth of the Firth River. Since the size of our skiff precluded portages, we decided to go back to Herschel Island to wait for good weather. After two weeks of waiting, during which time the ice came into the bay, and it snowed on us, we reluctantly turned back to Aklavik on the 3rd of August. It was especially hard to turn back since we had ample provisions and gasoline to make the additional 500 miles to Barrow.

"I am making plans to continue the work next summer, perhaps working out from Barrow, but the most important project for next summer is the excavation of enough houses to furnish the dating of the Kobuk sites."

Under a grant from the Rockefeller Foundation, Dr. Gutorm Gjessing of the Institute for Comparative Research in Human Culture, Oslo, has been studying petroglyphs at research centers in the United States and Canada. Dr. Gjessing's comprehensive monograph on the archeology of northern Norway, *Yngre Steinalder i Nord-Norge*, 1942, concludes with a chapter on the Circumpolar Stone Age (published separately in English in *Acta Arctica Scandinavica*, No. 2, Copenhagen, 1944), which discusses in detail the problem of cultural relationships between Eskimo and prehistoric cultures in northern Eurasia. Dr. Gjessing is the first Scandinavian archeologist to interest himself in this important problem and his conclusions are in substantial agreement with those of most American archaeologists working in the Arctic field. (*Henry B. Collins.*)

SOUTHWESTERN ARCHAEOLOGICAL CONFERENCE

A group of forty-five Southwestern archaeologists met informally at the Laboratory of Anthropology at Santa Fe on August 20, 21 and 22, 1946, for the first time since 1940, continuing the tradition of the Pecos and Chaco Canyon Conferences. Arrangements for the gathering were made by Dr. Erik K. Reed. At the first session, an address of welcome was made by Mr. James W. Young, President, in the absence, due to illness, of Maurice Ries, Director of the Laboratory. Dr. E. W. Haury was elected chairman of the meeting and Katharine Bartlett, secretary. A full report of the proceedings has been published in *El Palacio*, journal of the Museum of New Mexico, Santa Fe (Vol. 53, No. 10, October, 1946).

The group went on record as favoring reorganization of the American Anthropological Association, as presented by Dr. Leslie White, rather than the establishment of a new society, and a telegram to this effect was sent to Dr. Julian Steward, chairman of the reorganization committee. Concepts and methods of archaeology and the need of closer cooperation between archaeologists and ethnologists in the Southwest were discussed. The present status of Southwestern archaeology was reviewed, under the headings of Early Man, the Anasazi, the Hohokam, the Mogollon, the Patayan, northern and eastern peripheries, northern Mexico, and the Spanish Colonial period. The problems of interpretation of archaeology in museums, in publications for the layman, etc., were discussed with Dale S. King as chairman. Dr. Jesse L. Nusbaum reported that a movement was under way in Congress to repeal the Antiquities Act of 1906 and the Uniform Rules and Regulations, pointing out that all archaeologists and anthropologists of the country must make every effort to prevent such repeal.

Throughout the discussions there was a tendency to synthesize the results of archaeological research and to present broad pictures of the movements of prehistoric populations, their affinities with present Indian groups, etc.; and an interest in presenting the results of archaeological research intelligibly to the public. These are new trends in Southwestern archaeology that will be interesting to watch. (*Erik K. Reed.*)

THE FIRST SYMPOSIUM ON THE CADDOAN ARCHAEOLOGICAL AREA

The Symposium was held on the campus of the University of Oklahoma at Norman, September 12 to 14, 1946. Dr. J. Willis Stovall, Director of the Museum, and Mr. James B. Watson, Chairman of the Anthropology Department, were our hosts. The delegates were also welcomed by Dr. G. L. Cross, President of the University, and Dr. Roydon J. Dangerfield, Assistant to the President. Dr. Kenneth G. Orr, who was leaving Oklahoma for a new appointment in the Department of Anthropology, University of Chicago, and Mr. Alex D. Krieger, Department of Anthropology, University of Texas, acted as Chairman and Co-chairman (*Protem.*), respectively.

The purposes of the Symposium were:

1. To assemble detailed data relative to the definition of culture units throughout the Caddoan archaeological area.

2. To reach agreement on the content, identity, and interrelationships of culture units within the Caddoan area.

3. To integrate these units with those recognized in surrounding and related areas.

4. To discuss the broader implications of these correla-

tions in terms of the Southwest, Southeast, Plains, and Mexico.

5. To determine the major unsolved problems in Caddoan area research.

To accomplish these purposes, invitations had been extended to two groups of archaeologists: those conducting work and research within the Caddoan area, and those who have published broader interpretations involving "Caddoan" archaeology. Those in active research within the area were asked to bring whatever materials, such as characteristic specimens, trait lists, house and burial data, photographs, maps, charts, etc., would enable them to show objectively the content of each cultural association with which they were working. In addition, it was suggested that they bring any odd or intrusive, possibly trade, specimens so that others could identify them and trade relations between the cultures also be worked out. It was emphasized that no prepared papers would be read. We aimed at achieving a maximum of discussion with the actual specimens on hand, and a minimum of formality.

The Symposium succeeded far beyond expectations. The attendance of forty-one persons, about one-third of whom brought specimens, gave an excellent representation both within and without the "Caddoan area," and yet was not too great to hinder the intimacy of the arguments. A staggering amount of material was brought together, and a wealth of ideas resulted. We were especially fortunate in having three noted Mexican scientists present in Drs. Noguera, Du Solier, and Armillas, who made the long journey from Mexico City in order to lend their valuable opinions to our attempted correlations with Middle American cultures. It was also extremely gratifying to have both "amateurs" and professionals sit together and take equal parts in the work. The "amateurs" brought their collections and ideas, and in return received new outlooks and ideas. All participants were satisfied that they were dealing with an exceedingly complex field of inquiry, a far cry from the time specimens from this four-state area were simply "Caddoan." The list of participants is given below:

Armillas, Pedro—Dirección de Monumentos Préhispanicos, Mexico, D. F.
Baerreis, David A. and Mrs. Baerreis—Norman, Oklahoma
Chapman, Carl H.—University of Missouri
Deuel, Thorne—Illinois State Museum
Du Solier, Wilfrido—Instituto Nacional de Antropología e Historia, Mexico, D. F.
Griffin, James B.—University of Michigan
Hamilton, Henry W. and Mrs. Hamilton—Marshall, Missouri
Harris, R. K.—Dallas Archaeological Society, Dallas, Texas
Hodges, Dr. T. L. and Mrs. Hodges—Bismarck, Arkansas
Howard, Lynn E. and Mrs. Howard—Lexington, Oklahoma
Joslyn, Otis—Oklahoma City
Krieger, Alex D. and Mrs. Krieger—University of Texas
MacNeish, Richard S.—University of Chicago
McGregor, John C.—Illinois State Museum
Mera, H. P. and Mrs. Mera—Santa Fe, New Mexico
Miroir, M. P.—Texarkana, Texas
Morgan, L. S.—Oklahoma City
Neumann, Georg—University of Indiana
Newkumet, Phil and Mrs. Newkumet—University of Oklahoma
Noguera, Eduardo—Direccion de Monumentos Préhispanicos, Mexico, D. F.
Orr, Kenneth G. and Mrs. Orr—University of Chicago
Ray, John Henry and Mrs. Ray—Vernon, Texas
Shead, Ralph—University of Oklahoma
Spaulding, Albert C.—University of Kansas
Stovall, J. Willis—University of Oklahoma
Trager, George L.—University of Oklahoma
Trowbridge, Harry M.—Bethel, Kansas
Watson, James B. and Mrs. Watson—University of Oklahoma
Webb, Clarence H.—Shreveport, Louisiana
Witte, Adolph Henry—Henrietta, Texas
Wrench, Jesse E.—University of Missouri

FIRST DAY

As the Symposium was opened by Chairman Orr, the first question was that of how and where to publish the results. It was recommended that a preliminary report be prepared to place the principal results on record and that this should be followed by an extensive volume on the content and relationships of culture units in the "Caddoan area." Griffin proposed informally that the undersigned prepare this preliminary report and edit the extended volume, which was accepted. Mrs. James B. Watson was asked to act as secretary for future business, and to aid in accumulating material for the proposed volume.

The next problem was a definition of "Caddoan area," Mera objecting that a linguistic label should be avoided. A suitable geographic term for this area, embracing large parts of four states, was found to be very difficult if not impossible to find. It was agreed that "Caddoan area" would serve provisionally pending settlement upon a more acceptable name. As a rough preliminary guide the area was taken to include the adjoining sectors of Oklahoma, Arkansas, Louisiana, and Texas, bordered (approximately) by the Arkansas river on the north, by a line about 100 miles inland from the Gulf of Mexico on the south, a line running from about Tulsa to Dallas to Waco on the west, and by Bayou Maçon in eastern Louisiana and Arkansas on the east. The western and eastern boundaries just mentioned apply to historic times, whereas earlier "Caddoan" remains are confined to a much narrower belt stretching north and south along an axis formed by the Oklahoma-Arkansas and Texas-Louisiana borders. In the minds of most archaeologists, "Caddoan" has been applied loosely to a startling array of vessel forms including various bowls, bottles, jars, compound vessels, etc., which in most cases, were very well made and polished to a high degree, and decorated with many techniques such as engraving, incising, trailing (deep, polished-over grooves), punctating fingernail gouging and pinching, brushing, and occasionally dentate stamping. This complexity alone suggests that a number of distinct complexes and some historical depth can be traced in a way comparable to advanced Puebloan,

Hohokam, and Mexican cultures. Furthermore liberal quantities of pottery were commonly placed with the dead. Other ceramic remains are found in the "area" which are not generally called "Caddoan" but are involved in understanding the developments of the latter. Regarding such elements as mound building, placement of the dead, house types, projectile points, ornaments, ceremonial artifacts, etc., there are many differences in the "Caddoan" culture units which should become clear when the materials are presented in detail.

(Since it is planned to publish a volume on the "basic data" given on culture units during the first two days, with illustrations, the following is only an outline of what was presented.)

Cultural material which could satisfactorily be associated with Caddoan tribes in historic times was taken up first. Dr. Webb described the Glendora focus, using his collections from the Red River Valley in northwestern Louisiana. Characteristic pottery forms and decorations, single extended burials in floodplain cemeteries, lack of mound building, head deformation, and the nature of various artifacts were explained. Not all Glendora components yield European contact material but there is no question that the culture extended into full historic times after the French explorations beginning in 1686.

Mrs. Hodges next described the material collected by Dr. Hodges and herself from the Ouachita River Valley between Arkadelphia and Hot Springs in west-central Arkansas. An extremely interesting array of vessels and other artifacts found in a single association which Mrs. Hodges calls Mid-Ouachita focus was shown, including some strikingly beautiful, black polished bottles with engraved decoration, three-legged bottles, two-chambered bottles, a bear effigy vessel with full body in seated position and legs outstretched, a remarkable series of polished "seed jars" ranging from globular to cylindrical in shape with a small opening at the top, most of which seem especially characteristic of this complex. It was stated that no evidence of European contact has ever been found within a radius of twenty-five miles from Bismarck, although the archaeological remains are very rich. Mrs. Hodges pointed out that Mid-Ouachita focus can probably be ascribed to the Cahinnio group of Caddo found by the De Soto expedition in 1541.

Next, the Frankston focus, found in east-central Texas in the valleys of the Neches, Angelina, and Trinity Rivers, was described by Krieger. This focus lies on the western frontiers of the "Caddoan area" and the Southeastern province as a whole. It is the most divergent of all late "Caddoan" complexes in vessel forms and decorations. Some Frankston components yield European artifacts and a new pottery type which, conversely, is absent from components not showing European material. The largest components are located almost exactly where Swanton locates the chief tribes of the Hasiani Caddo. These tribes were linguistically the same as Red River Caddo but formed a separate political union. They were the last tribes reached by De Soto's men before they turned back toward the Mississippi from their attempted overland trip to Mexico in 1542. They were already in possession of turquoise and cotton blankets at that time, probably receiving them from the Puebloans. Iron axes and knives, and glass beads, could have reached these peoples considerably in advance of Europeans themselves (except De Soto), for there is documentary evidence that Jumano Indians began a lively trade between the "Tejas" (Hasiani) and the Spanish missions and posts of New Mexico as well as northeastern Mexico as early as 1600, if not before.

Mr. Harris then described a series of pottery-bearing sites in the valleys of the East Fork and Elm Fork of Trinity River in the vicinity of Dallas, Texas. The pottery is almost wholly of Frankston focus types and so nearly identical to this ware in the Neches valley that it is probable it was all carried westward to the Dallas area, rather than made there. It is thought that this activity occurred in very late times, after 1600 and perhaps only after 1700, when Wichita tribes were moving southward across Red River and mingling with Hasinai who were spreading westward in the north Texas plains.

The Titus focus of northeastern Texas was then briefly discussed by Krieger. Among the characteristic vessels are certain jars and ollas which may reflect Puebloan influence, and five Puebloan trade sherds are known which help to date the focus at about 1450–1600 A.D.

Dr. Webb next described the Belcher focus of northwestern Louisiana, and the Bossier focus, found on both sides of the upper Texas-Louisiana border. The former is based on a site at Belcher on Red River above Shreveport, and is shown to have been contemporaneous with Titus and Texarkana foci through intrusive sherds. It also provides the closest prototypes for the historic Glendora focus. At the same time, it reveals several traits which appear to be survivals from an earlier horizon, such as multiple burials, mound-building, and engraved conch shells. The Bossier focus was a simpler culture, and contrasts with all the others is being found principally in hillside sites rather than bottomland.

Following this, the Texarkana focus, found about the bend of Red River in the corners of Texas and Arkansas, was described by Krieger. Typical specimens from the Hatchel site near Texarkana were shown, and the superimposition of three distinct cultures at this site discussed; here a Haley Focus component with two superimposed temple mounds was overlain by the Texarkana component, and this in turn by a Glendora component without European objects.

The Haley focus was the next to be treated, and its connections were shown to be with a different and earlier set of foci than those so far mentioned. Its relationships with Spiro, Gahagan, Sanders, and Alto were much closer than with any of the later cultures such as Titus, Belcher, Texarkana, etc. Yet several vessel forms and decorative treatments suggest prototypes for Texarkana and Belcher, in particular.

Dr. Webb then showed typical specimens from Gahagan, presented a list of traits, and discussed this focus in relation to Haley, Spiro, and Alto while pointing out the differences from the later Belcher focus. (Unfortunately, Webb had to leave at the close of this day and could not take part in our later discussions).

SECOND DAY

Continuing with the earlier horizon, discussion of which had begun late the previous day with the Haley and Gahagan foci, Krieger described the Alto and Sanders foci in northeast Texas. Alto focus is based on the Davis site, a large village and temple mound on Neches River in Cherokee County. Although the Neches Valley is littered with components of Frankston focus, the Davis site differs from them in almost every respect except the possession of engraved, incised, and punctated decorative techniques. The work is very much better done, and much of the best pottery is a highly polished black ware with extremely fine engraved lines filled with red pigment. This pottery occurs in the flat-topped mound as well as the village under it. The village also yielded large amounts of sand-tempered plain and incised pottery similar to the Alexander series of Alabama and Tennessee, as well as about thirty-five sherds of Marksville and Troyville types. The association of these three complexes is not proved by a single site, but if true has interesting implications in connection with Middle American ceramics. Fine engraving very similar to that found in Archaic cultures of Mexico and Guatemala (and surviving into later periods) may have been present in east-central Texas as early as Marksville or Troyville times. The Davis site appears at present to be the earliest with this technique in the entire "Caddoan area." The Gahagan focus treated by Webb contains very little pottery, all of which is indistinguishable from the resident Alto focus types. However, no sign of ceremonial complexes comparable to Spiro or Gahagan has been found in Alto components, but pipes, celts, projectile points, earspools of stone and pottery, quartz crystals, flint blades with recurved edges ("Copena points"), and other items definitely connect Alto focus with the earlier group of foci in the "Caddoan area." Frankston and Titus sherds found on the Davis site surface support this position.

Sanders focus is based on a large site just south of Red River in Lamar County, northeast Texas. Other components are found in a narrow north-south belt reaching about 100 miles into Texas, and some distance into Oklahoma. Characteristic vessels and other artifacts were shown, as were a number of gorgets, dippers, cylindrical and disk beads of various sizes, all of conch shell, and bison-scapula hoe blades, both stone and pottery pipes, a variety of bone artifacts, and copper-covered earspools. The engraved conch-shell artifacts closely resemble "Southern Cult" objects at Spiro in their motifs and style of figuration. According to Orr, the Sanders pieces are most like those of the late phase of Spiro focus (see below), when the great Spiro ceremonial complex was on the wane. Sanders-type pottery vessels in the same phase at Spiro support such a connection. Sanders is also cross-tied with Haley focus by trade pottery.

(Up to this point no Oklahoma cultures had been treated. We had, rather, built up a picture of late and then early cultures in Louisiana, Arkansas, and Texas, so that the sequence found in Oklahoma would be thrown into sharper focus.)

Orr described a Nelson focus in south-central Oklahoma. This was seen to be very similar to the Sanders focus in Texas just to the south, except that "Southern Cult" material is almost completely lacking. Haley focus trade sherds are found here, as in Sanders.

Baerreis then took up the McCurtain focus, recognized through excavations in extreme southeastern Oklahoma. This material was shown very effectively with Kodachrome slides. Like the Belcher focus type site in Louisiana, one McCurtain site shows the survival of certain elements from an earlier horizon represented by Haley, Spiro, Gahagan, etc. These traits include mound building, very large graves with multiple burials, and the carving and incising of shell gorgets. Some of the pottery is extremely beautiful and closely parallels that of Texarkana focus in shapes and decorative techniques. Red film, shell temper, and both body and rim quadration are common. Certain vessels, principally bottles with bulging necks and complex scroll designs, are very close to Glendora focus styles. Pottery elbow pipes and making of miniature vessels are shared with other foci of this horizon. Ceremonial material comparable to Spiro is absent, but certain motifs, probably symbolic in Spiro culture, are found in McCurtain focus vessels. Shell gorgets are simple, with a voluted central cross, and lack the complex figures seen at Spiro. Houses seem to be less carefully made and smaller relatives of Spiro dwellings, rectangular, with two large central supports on the longer axis and extended entranceway.

Orr next reviewed the culture sequence at the Spiro site and vicinity, also using Kodachrome slides. As this has recently appeared in print,[1] there is no need to repeat it here except for certain indicated relationships. The latest unit, Fort Coffee focus, was described first, and it was shown that (1) by this time all traces of the "Southern Cult" had disappeared from eastern Oklahoma, and (2) the Fort Coffee focus presents an interesting acculturation problem, there being "Caddoan" influence from McCurtain focus on the pottery (although it is largely a unique complex), and on the other hand definite Plains influences can be seen in the use of bisonscapula hoe blades, stone elbow pipes, shaft smoothers, triangular plain and side-notched arrow points, beveled diamond-shaped knives, and small snub-nosed scrapers. These Plains elements penetrated the "Caddoan area" in late times in those cultures facing the open Plains. It is thought that Fort Coffee focus dates into near-historic times because of Glendora-like vessels similar to those mentioned in McCurtain focus, but no contact with Europeans has been found.

Working back to the Spiro sequence itself, Orr discussed the Late Spiro component, showing vessels which appear to be prototypes of Fort Coffee, and trade vessels from Bryan focus (see below). The Middle Spiro component (which is Spiro focus) was divided into an early and a late phase, with the richest ceremonial material belonging to the early phase and decreasing in the later. The late phase can be correlated with Haley focus, Sanders focus, Nelson focus, late Coles Creek, and perhaps with some Middle Mississippi units. The early phase of the Middle Spiro

[1] American Antiquity, vol. 11, pp. 228–56, 1946.

component is more unique, however, and seems to have been a blend of Early Spiro and new influences, possibly Middle American in part. The Early Spiro component lacks nearly all the ceremonial features of Middle Spiro (or Spiro focus), and its pottery resembles very closely the Early Coles Creek complex found at the Crenshaw mounds in southwest Arkansas by Judge Lemley; it also may have been partly derived from such a ceramic complex as that of Fourche Maline focus (see below).

Mr. Trowbridge then told about his nationally famous collection of textiles from the Spiro mound, explaining how they had been recovered, cleaned, treated, placed under glass, and mounted for exhibition. The textiles, of different weaves, materials, and a variety of colors, are on display in a special room of the Kansas City Museum. An impressive number of elaborately decorated conch shells from Spiro, also collected by Mr. Trowbridge, were shown in drawings he had made.

(This completed our examination of cultural units which could be called "Caddoan" in the general sense. We then took up several complexes which lack the richness of form and decoration of pottery which we have said characterizes "Caddoan" culture, but which seem either to have contributed to the growth of the latter or to have been influenced by it.)

Newkumet described the important Fourche Maline focus, found in southern Le Flore County, eastern Oklahoma, south of the Spiro area but north of McCurtain County. The utility jars of this complex, in particular, seem to provide prototypes for "Caddoan" units in eastern Oklahoma. Cylindrical jars with incised rim decoration are surprisingly like those of Sanders focus and in some cases are indistinguishable; however, other jars have a variety of unique curvilinear incised designs which cannot be found in any "Caddoan" unit. Engraving is absent and there is no suggestion of "Southern Cult" elements. On the other hand there are such early eastern traits as atlatl weights, boatstones, stone real-shaped objects, bone atlatl hooks, and contracting-stem dart points. Burials were both flexed and extended, and found singly and in mass graves. Bone whistles, bone tubes, long bone pins, notched "sinkers," double-bitted chipped stone axes, a variety of celts, small stemmed projectile points, and many other objects were shown.

Baerreis described the Bryan focus in southeastern Oklahoma in sites to the west of McCurtain focus. Another acculturation problem is evident here in that there are both "Caddoan" and Plains traits. The houses were square with four centerposts, central clay-lined fire basin, and extended entranceway. The pottery includes both shell- and clay-tempered vessels, chiefly large jars and deep bowls. Elbow pipes of pottery are quite like those of McCurtain and Texarkana focus. Use of deep cache pits would seem to be a Plains trait rather than "Caddoan."

Howard showed characteristic material from the Grant focus in south-central Oklahoma in the lower Washita River Valley above its confluence with the Red. Houses were similar to those of Bryan focus, and the burials flexed to semiflexed without offerings. Socketed bison-scapula hoe blades, bison cannon-bone chisels, triangular arrow points with and without side notches, sandstone shaft smoothers, small snub-nosed scrapers, stone elbow pipes, cache pits, and shell-tempered jars with rare instances of two or four strap handles, all mark this focus as a southern Plains culture rather than "Caddoan." It agrees in many ways with what is called Henrietta focus in north-central Texas across the Red River, and like the latter shows a southward spread of a Plains mode of life in late pre-European times; it was probably contemporaneous with Paint Creek of central Kansas and protohistoric Pawnee.

Unfortunately, time was running out and it was not possible to give adequate attention to the important Red River Valley collections which Mr. Witte of Henrietta had brought to Norman. It was hoped that future Symposiums would enable us to study these collections in detail.

THIRD DAY (RELATIONSHIPS)

This day was devoted to discussing the broader implications of cultural units outlined the two preceding days. The account is necessarily condensed.

Neumann gave a brief resumé of possible relationships between some American Indian physical types and archaeological groupings. At least twelve larger groupings on the order of varieties can be recognized among American Indians (*e.g.*, Margid, Sylvid, Centralid, Pacifid, Prairid, etc.) and more will probably become known with more work. The remains of an early, rugged Upper Paleolithic survivor variety are found from Alaska to California, and south to southern Chile. There are early types in the eastern United States which may be either Sylvid or Margid. A somewhat divergent Margid type is found in the Indian Knoll shellheaps of Kentucky, and a related group is associated with the Fourche-Maline complex in eastern Oklahoma. The latter group may have survived in the Bryan focus population. At the end of the Early component of Spiro we may expect to find an infusion of new people.

Historic Caddoan and some Siouan tribes certainly indicate a late addition of a Pacifid element resulting in a Prairid variety, which is represented in the southern Plains by such groups as the Arikara, Osage, and Baerreis' Neosho focus. The time of first appearance and the role played by Centralids in the southeastern states is not well known. Their presence on the Texas coast, in Mogollon sites, in Copena mounds, and among historic Choctaw, Chickasaw, and Seminoles evoke tempting speculations which await solution with study of more skeletal remains.

Krieger showed a chronology chart for culture units in the "Caddoan area" and gave provisional correlations with adjoining regions. This information was given principally to show whether comparisons were being made within the same general periods.[2] According to this chronology, the spectacular ceremonial complex of Spiro focus existed in its richest form at perhaps 1300 A.D., after which it declined and was finally followed by Fort Coffee focus in which no ceremonial cult can be seen, as Orr has already explained.

Griffin: There are probably exceptions to such a chronology. For example, if Pawnee culture developed from the

[2] For a chart, map, and resumé of this scheme see the article on pp. 141-8 of this issue.

influence of Oneota on what was essentially Upper Republican, this could hardly have taken place before 1600; in eastern Nebraska, at least, Upper Republican must have lasted until well after 1500.

Spaulding: In the Plains cultures of Kansas there is little evidence of influence from the Caddoan area. Trade material apparently from Arkansas has been found in Upper Republican sites. Wichita sites show few tie-ins with the Caddoan area.

Chapman: The Ozarks probably provided a barrier to the spread of Caddoan culture on this side. Oneota culture is very similar to Neosho focus of northeastern Oklahoma.

Orr: The apparent lack of strong Caddoan area influence in the Plains is paralleled by general lack of Plains influences in the Caddoan area until relatively late times. Definite Plains influences appear during the Late Spiro component and the following Fort Coffee focus in the form of scapula hoes, diamond-shaped knives, L-shaped stone pipes, etc.

Baerreis: The Neosho focus was not closely related to Caddoan cultures but shared some general Plains traits with Fort Coffee focus. The earlier Hopewellian culture in the same area may be involved in an understanding of Hopewellian-like traits at Spiro.

Orr: We might consider the possibility of two main influences in the Spiro area: Hopewellian (or some derived culture) and Middle American.

Deuel discussed the relative chronological depth of Mississippian and Hopewellian cultures. It was once thought that Middle Mississippi developed in the central Mississippi basin, but it now seems possible that the earliest developments were farther west. There seems to have been some connection between Ohio Hopewell and Spiro in burial and ceremonial traits, pipes, ornaments, and copper work, all of which could have been carried together as a ceremonial complex, but hardly any single object from Spiro could be mistaken for Hopewellian. Any direct connecting links remain to be found and there still seems to be a considerable time gap between them.

Griffin gave a resumé of the central Mississippi Valley survey made by Ford, Phillips, and Griffin in 1940–41, based on about 500 sites, mostly pottery-bearing. The survey helps bridge the large gap between Louisiana and southern Illinois. The valley was occupied from non-pottery times through early and late pottery horizons up to historic times. Pyramidal mounds clearly appear together with clay-tempered pottery in the central valley.

The St. Francis focus is found from southeast Missouri to near Helena in northern Arkansas. Typical sites such as Parkin, Neely's Ferry, Turnbow, and others are described in C. B. Moore's publications. The pottery is nearly all shell-tempered; vessels are thick and rather crude, the majority plain. Handles run from small loop to strap forms. Red filming is fairly common, as is a red-on-buff painted type, while polychromes of red-and-white-on-buff and red-white-and-black may be later. Punctation and cross-hatched incising are found on jar rims. "Southern cult" material is absent.

The Alpika focus also occurs in this region with Walls, Mississippi and Pecan Point, Arkansas, typical sites. Engraved decoration on polished grey to black pottery is similar to that at Moundville, and in both cases may be due to influence from the Caddoan cultures. "Southern cult" material is similar to that at Moundville. Engraved pottery continues in historic Natchez after 1700; Moundville and Alpika precede this horizon an unknown time, and St. Francis in the main seems to precede Moundville-Alpika.

In the Cahokia area, southern Illinois, Old Village focus is followed by "Bean Pot" (Trappist) focus, both Middle Mississippi cultures. Trade sherds (shown) and small projectile points with bulb-shaped stems and flaring barbs, both suggest contact with Caddoan cultures.

Orr: The projectile points mentioned are common to Spiro and Cahokia. The Cahokia sherd shown by Griffin fits into the Late-Middle or even Late component at Spiro.

Krieger: The same projectile point style is common to all five foci of Gibson aspect (which would include late Middle Spiro) but is not known at all in the entire Fulton aspect. According to the present chronology, the Trappist points are considerably later and probably represent a trait diffused northward to Cahokia. One of Griffin's Cahokia sherds, on the other hand, is plainly Taylor Engraved, a type common to Belcher and Titus focus.

Griffin: The two Middle Mississippi periods at Cahokia would seem to correlate with the two main Caddoan periods in a general way. An earspool from a platform in the Powell mound (Trappist focus) has a precise duplicate from the Grant mound in the St. John's area, Florida, which in turn ties in with Gahagan and Spiro.

Deuel: Were there parallel developments of what we call Mississippi culture both east and west of the Mississippi River, or did it spread mainly from a single center?

Griffin: There is no evidence for the priority of the lower Mississippi Valley as the center of development in any period of the eastern United States; the claimed priority could be true but there is no evidence now for it. The best evidence for time of development of Mississippi culture may be in Texas, unless the Mississippian culture elements which seem to be derived from Middle America reached the eastern states by a different route (as by boat to the Mississippi delta). The idea of extreme time necessary for the spread of cultural ideas is wrong. To answer Deuel, I think there were parallel developments of Mississippi culture in the Middle Mississippi and Caddoan areas; we don't know yet which was the older.

Krieger: The same may be said in the case of protohistoric Pawnee and the Fulton aspect; we cannot choose between them yet as to age and direction of borrowing of the few traits in common.

Mrs. Hodges: A "Middle Mississippi" painted bottle from a Watermelon Island grave (Mid-Ouachita focus) shows the contemporaneity of these cultures.

Mera: It is very unfortunate to equate culture areas with linguistic groups. The history of Southwestern archaeology shows the necessity for getting away from that. We now have three terms meaning "ancient people" or the equivalent (Anasazi, Hohokam, Patayan) and one geographical term (Mogollon) to designate the main cultural areas in the Southwest. I would suggest that someone find a Caddoan term for "ancient people," or even a geographical name to

cover the material in this extensive area. (There was general agreement with Mera.)

Regarding vessel forms in the Southwest and the "Caddoan area," there is some similarity in carinated bowls, but these are all very late in the Southwest, dating from about 1500 to modern times. In the Southwest there is an orderly development of these bowls from a plain spherical form to one with thickened rim and a carina on the inside, to a carina on the outside. The entire development may be traced in the upper Rio Grande area, but there may have been some connection with Caddoan if the time is consistent.

A development of the interlocking scroll design can also be traced in Anasazi pottery from unorganized lines and dots in Basketmaker, then dots appended to lines, then a comb effect, then square interlocking elements. Similar interlocking scrolls are found in Hohokam and Mogollon, and through Middle America to Argentina. Interlocking scrolls also appear in incised and engraved designs on some "Caddoan" pottery and in painted designs of the St. Francis focus. Anasazi is a region in which various groups fired pottery in reducing atmosphere, while Hohokam and Mogollon are regions in which an oxidizing atmosphere was used. El Paso Polychome, several terracottas, some Upper Gila pottery, and Mimbres Black-on-White were developed from a Mogollon base.

Du Solier: Is there any connection between black-on-white painting in the Southwest and in the Huasteca? Black-on-white decoration is confined to the Huasteca area in Mexico (except for where the Southwestern cultures enter Mexico) and was very late there.

Mera: The idea of black-on-white decoration probably passed southward into Chihuahua through the spread of Mimbres pottery. Black-on-white designs are usually rigidly geometrical in the Southwest and do not seem much like Huastecan. However, the idea of a white slip as a base for decoration might have influenced Huastecan pottery from that direction. Chupadero Black-on-White developed in the late 1100's as a result of the black-on-white idea being taken into brown ware territory. The type lasted nearly 300 years, with no change for 200, and is thus poor for dating within this span.

Du Solier: A black-and-red-on-white polychrome occurs late in the Huasteca

Mera: This went out rather early in the Southwest except in the north.

Krieger: The dates seem to agree in general where these techniques are involved. Black-on-white painting appears in the Huasteca before its decline in the Southwest in the 14th century; however, the designs are strangely like those on late Rio Grande glazes. There is also surprising correspondence in bowl forms in Rio Grande glaze periods III to V, and the Texarkana and McCurtain foci. (Figures were shown.) There are many interesting similarities in engraved and incised decoration, as well as in certain vessel forms, in the Huastecan and Caddoan areas. There is an interesting and important three-way problem in ceramic relationships between the later Puebloan, Huastecan, and Caddoan cultures.

Two distinct trade routes for Southwestern pottery can be seen in Texas: (1) a southern one by which Chupadero Black-on-White, El Paso Polychrome, and occasionally Lincoln Black-on-Red and Three Rivers Red-on-Terracotta, were carried eastward from southeast New Mexico, Chupadero being carried farthest and finally reaching almost to Louisiana; (2) a northern route by which early glazes and St. Johns Polychrome were carried northeastward from northern New Mexico into the Canadian valley villages, and subsequently the late glazes were carried as far as central Kansas. It seems significant that southern types such as Chupadero and El Paso were carried far eastward but not toward the Plains.

McGregor: It is interesting that ceramic trade from the Southwest was from no farther west than the Rio Grande, except perhaps for St. Johns Polychrome. Seemingly the more colorful pieces, and earlier types, were not traded.

American archaeology shows very wide contacts and almost no isolation. At times there was actual trade; in other cases, a general knowledge of other peoples far away, which may explain the vague similarities seen between "Caddoan" and Southwestern pottery, but there are several general resemblances which are important if they are of the same specific time periods. The Pecos and Texarkana focus bowls come the closest to identity. There are many cases of parallel similarity in the Southwest, which I assume indicate mutual awareness, but without identity. By identity I mean that the same types actually came from the same source.

Krieger: In the case of some Southwestern and "Caddoan" ceramic features, the most closely comparable elements do fall consistently into the same rather narrow period. This period probably covered some three centuries from roughly 1400 up to full historic times (about 1700). Before this period there are almost no similarities strong enough to suggest contact. Therefore the resemblances in vessel forms, certain design motifs, neck-banding, etc., in the two regions must have resulted from late influences rather than parallel developments from an early cultural substratum.

Mera: Culture should show orderly development unless something breaks into it to change its course. Puebloans and Caddoans were distinct ethnologically, but there may have been some contacts between them.

MacNeish gave a resumé of his archaeological survey in Tamaulipas, Mexico during 1945–46. The survey was made along the coastal plain of Tamaulipas and in mountainous areas farther inland from the Rio Grande southward to the Sierra de Tamaulipas. (Since this is to appear in AMERICAN ANTIQUITY, only interpretative remarks are given here.)

The various aberrant projectile points found in Tamaulipas complexes show that a route of contact between northeast Mexico and the southeastern United States must have passed through central Texas rather than along the Gulf. In the Huasteca area the evidence of contact with the southeastern United States almost all falls into periods V and VI, which date from about 1050 to 1500 A.D. Many artifacts and ceremonial symbols are similar in Huasteca V material and the "Southern cult" of the eastern states, especially at Spiro. The Huasteca symbols are found on carved shell gorgets and on painted murals found by

Du Solier at Tamuín in San Luis Potosí, and on conch shells and gorgets at Spiro. The list of common elements includes a figure similar to the monolithic ax; the cross; "sun-circle"; death motif; entwined serpents; serpents held in hand; opposed human figures in fighting, running, and kneeling positions; plumes on head; earspool with tassel; beaded bands on arms and legs; necklace with columnella pendants; belts; batons; severed head held by hair; feathered eye (weeping eye not known in Huasteca); and probably several more. Large T-shaped stone pipes from Guadalcayas, San Luis Potosí, are very similar to the special Spiro form, and pottery elbow pipes with a short spur jutting beyond the bowl are almost exactly like those of Texarkana focus. Carinated bowls and tripod vessels are also common to Huasteca V and Spiro.[3]

The "Southern cult" complex now seems to be earlier in the Caddoan area, specifically at Spiro, than in the Mississippi Valley or to the east. Certain trait distributions support the idea that cult material at Moundville was later than at Spiro. If Krieger's datings in the Caddoan area prove correct, Spiro agrees well with the end of Huasteca V. Two or three pottery heads, a Huastecan stone head, and a clay spindle whorl from various points in Texas are obviously Mexican in origin and show that such objects were carried northward toward the Red River.

Hamilton showed a drawing of a carved bone from Spiro. Most members thought the carving a direct copy of a codex figure, easily distinguished from Spiro in style. Hamilton himself made no claims for its authenticity.

Krieger: There may be some question as to the degree of cultural connection across Texas. The projectile points from Texas cultures in the Tamaulipas complexes are plainly odd and intrusive there and probably show that various simple and highly nomadic hunting tribes of south Texas and northeastern Mexico roamed about considerably. However, between the northern boundary of Middle America proper at the Soto La Marina River and the western frontiers of "Caddoan" territory in northeast Texas, there remained a gap of about 800 miles in which no Middle American culture traits were ever established. Any possible transfer of Middle American elements across this gap must have taken place very rapidly, probably through hostile peoples. That this was not unlikely is shown by the extreme unfriendliness of Texas coast Indians to all strangers, Indian and white, from their discovery in 1527 onward. This is important in our chronology, for if movements were rapid it is not necessary to allow any appreciable time for the transfer of cultural ideas from Huastecan to Caddoan territory, or the reverse.

Mera: In line with your correlation of Huastecan and Caddoan ceremonial traits, the plumed serpent motif was very late in the Anasazi area, dating about 1300 to 1500 A.D.

Krieger: There is danger in overstating the case for Middle American influences through the Huasteca. For instance, at least two quite distinct ceramic traditions are involved in the Gibson aspect. One of these, concerned with highly polished dark pottery decorated with engraved lines filled with pigments, surely leads back into Middle America, but we do not know yet whether the original stimulus was from the Huasteca area. The other, concerned with less finely made polished pottery decorated with incised and punctated units, including scrolls, seems to lead eastward to Coles Creek and Troyville in Louisiana and to Weeden Island in northwest Florida; this pottery in turn probably leads back to Hopewellian and its ultimate origin is still unknown. In addition, cooking vessels in the various "Caddoan" units may provide still a third problem, for in general their shapes suggest some Woodland jars with flat bases.

There are two separate problems of origin to be solved—ceramic and ceremonial—in the Caddoan area, and I believe they represent different periods. The engraving tradition must have been introduced at an earlier time than that which saw Huastecan ceremonial influence. Moreover, while there were probably certain additions to the "Southern cult" complex from the Huasteca, many of its features are not Mexican. What we have accomplished on this, mainly, is to narrow down the "Middle American" generality to a fairly specific influence from the Huasteca at a rather definite time (Huasteca period V, or Mazapan to early Mixteca-Nahua in central Mexico). This influence may now be weighed against the problems of indigenous origin of Southeastern traits.

Noguera discussed the presence of similar vessel forms in the Caddoan area and Mexico. Only those vessels displayed on the tables were considered. In general, most resemblances were with western Mexico (Michoacan and Guerrero) and the Valley of Mexico.

A deep bowl with shallow bottom, angular shoulder, and flaring rim is found in Michoacan and is similar to a form found earliest in the Haley focus, and modified somewhat in the Texarkana, McCurtain, Belcher, and Titus foci. Another form with spherical body and quadrated upright rim is found in many areas of Mexico and resembles a form in Titus, Belcher, and Texarkana pottery. Small vessels covered with applied nodes, probably common to all Fulton aspect foci, occur in Mazapan culture. Another bowl with wide convex bottom, sharply inturned shoulder, and low flaring rim is a common form in the Texarkana and McCurtain foci and occurs in western Mexico. A jar with spherical body and a very high outcurving rim occurs in the Belcher and Texarkana foci, and in late Teotihuacan. Composite bottles with the upper chamber divided into four lobes are found in late Huasteca and almost exactly duplicate a specimen from Titus focus.[4]

The general lack of tripod bowls in the Southeast is puzzling, for they are very plentiful in most Mexican cultures. It is also odd that cazuela bowls are late in the "Caddoan area" because in Mexico they are relatively early. There was probably a wave of contact in early times, while the regions were more isolated later.

Griffin: In Mexico many items similar to Caddoan and Middle Mississippi appear in the Archaic. In northern Mexico ceremonial elements passed to the southeastern United States from the general Mixteca-Nahua cultures between about 1000 and 1300 A.D.

[3] The pottery problem here is complex and involves three or more foci of the "Caddoan area" in different ways. A joint paper by Du Solier, Griffin, and Krieger on Buena Vista pottery is in preparation.

[4] Dr. Armillas plans to study these vessel forms in detail in Mexico and the southeastern United States.

MacNeish: In Pueblito culture (Tamaulipas), vessel forms compare with Huasteca II–III, while figurines are like Huasteca III–V. This is a good case of culture lag and probably other early Mexican traits lagged in time.

Du Solier: The shapes discussed by Noguera passed from the Archaic into Teotihuacan. In the Huasteca there are special influences from Teotihuacan which may have been passed on still farther.

Noguera: Engraving continued from Archaic on into the Mazapan period and is also found at Cholula.

Armillas: Metates are found in all Mexican cultures. Not all have legs but all show back-and-forth motion. Huasteca metates have no legs. In Guerrero there is a unique form with hollow surface which is similar to Caddo metates.

Krieger: Metates are not found in the Caddoan area, if this term is confined to back-and-forth motion. The literature is confusing because all grinding stones have been called "metates" regardless of the motion used. In the Caddoan area only small unshaped stones were used, and the motion was rotary.

Mrs. Hodges: A three-legged metate of Mexican type has been found in Arkansas. (Discussion indicated this might have been of historic Spanish introduction, such objects having been carried to mission sites from Mexico.)

Armillas: The use of copper in the southeastern United States must have come from a northern source and ought to be older than in Mexico.

Griffin: The use of copper seems to precede pottery in the Great Lakes area. The use of sheet copper began in Adena-Hopewell. This was older than the Mexican copper work.

Armillas: There is no metal work at Tula (900–1200) but it can be found a little earlier in southern and western Mexico and reached the Hohokam area, Arizona, about 900. Western Mexico is linked with the Huasteca in many ways. Decoration of pottery by engraving and red paint fill is similar to that at Teotihuacan, which appeared about 400 and lasted until 900 A.D. This trait is too special for parallel development.

One Mexican tradition says Quetzalcoatl arrived at the mouth of the Pánuco River by sea. Legends also speak of migrations along the Pacific shore. They at least suggest that the people thought in terms of traveling long distances at sea.

Du Solier discussed the presence of similar traits in the Caddoan and Huastecan areas. (He drew his Huastecan list from Ekholm's Tampico excavations and the Buena Vista site in San Luis Potosí.) These traits include black polished cazuela bowls, engraved with red ochre fill; three-legged bottles; composite jar with basal ring; brushed jar surfaces; frog effigy vessels; pottery elbow pipes with spur or handle at distal end; stone T-shaped platform pipes; deer-ulna awls; conch columnellae with ends cut square; tops of conch shells cut across to show the whorl ("god of winds"); tortoise-shell rattle with shells inside; quartz crystals in burials; flexed multiple burials; cremation on clay floor under mounds (Spiro focus only, in Caddoan); trophy heads and an altar with skull offerings (Spiro); fronto-occipital head deformation; shell gorgets with a cross in the center; negative S-shaped element and "feathered" eye symbol on mural figures; clay mounds (about 60 per cent round and truncated), pyramidal mounds (late), and round buildings. Negative-painted and red-on-buff pottery were also mentioned, but it was pointed that these are "Middle Mississippi' traits found only intrusively in "Caddoan" sites.

These Huastecan traits belong mainly to period V in Ekholm's sequence, which correlates with Mazapan in central Mexico. Mazapan ended about 1200 A.D. there, but due to cultural lag, Huasteca V may have ended about 1300. The Maya and Huasteca were very closely related at first, but they grew more divergent.

Noguera: This is true in other parts of Mexico, early traits being widespread while late traits were more local.

Krieger: The apparent discrepancy in age of Huasteca V and the "Caddoan" horizons is not too great. The Buena Vista ceremonial material points to connection with Middle Spiro, but some of its pottery is much more like Texarkana, which correlates with Late Spiro. The present minimum date for Texarkana focus is about 100 to 200 years later than the end of Huasteca V but future adjustments one way or the other may close this gap. Between Spiro and Huasteca V the difference seems to have been not more than 100 years at the most, and considering our imperfect methods, there may not have been a gap.

Griffin: We know of remarkably few resemblances between Middle America eastern United States up to the Middle Mississippi period. The Pueblito of Tamaulipas ties in best with the Gibson aspect in time, so perhaps the pyramidal mound and engraving appeared in the eastern states together through contact between these two cultures, or similar ones. Subsequently, the Buena Vista ceremonial complex probably influenced the development of the Southeastern cult. Apparently there was not an actual movement of people, for there are too many common Mexican traits missing in the eastern United States.

Krieger: There is no longer much doubt in my mind that Spiro was the approximate place of entry of several Huastecan traits in the eastern states, and that these were accretions to a flourishing culture rather than original stimuli.

Du Solier: There are many unexplored areas in the northern portion of Buena Vista and Guazconia, San Luis Potosí, which may provide the answers to many of these questions.

Orr: One thing especially needed is a detailed study of culture growth in the "Caddoan area." The nature of the impact of outside influence, and the degree of cultural assimilation should also be determined.

MacNeish: The relationships between Middle Mississippi and Spiro focus is one of our biggest problems. Analysis of the physical types is also important.

Time did not permit an adequate discussion of the most urgent problems for the future. Orr was asked to form a committee to consider the permanency of the Symposium, to study the research problems, and (in line with Mera's suggestion) to find a name to replace "Caddoan" for archaeological purposes.[5]

In conclusion, the Symposium was very successful in

[5] In December, Newkumet obtained a Caddoan word *kabiáksi*, meaning old, ancient, or of former times, for consideration.

pointing to a large number of problems which need further work. We could not hope to solve these in one session, but there was no doubt left that the field is vastly complicated. Thanks are due our kind hosts, Drs. Stovall, Watson, and Orr, for making the Symposium arrangements, for their encouragement and enthusiasm, and to the University of Oklahoma. *(Alex D. Krieger.)*

CONFERENCE ON IROQUOIS RESEARCH

The second Conference on Iroquois Research, which met for the first time last year, assembled a good attendance of anthropologists from the northeastern states and Canada at the Allegany State Park, Red House, N. Y., October 4–6, 1946. As chairman of the Allegany State Park Commission, Mr. Charles E. Congdon of Salamanca again made available to the Conference the Administration Building on Red House Lake, which is situated in a wilderness area, flanked by the Allegany Reservation of the Seneca Nation. Merle H. Deardorff of Warren, Pennsylvania, was co-host.

Sessions were devoted to a report and discussion of field studies in Iroquois ethnology (with Fenton presiding), to remarks on history and the Iroquois (by Arthur C. Parker and Paul A. W. Wallace), and to a lively discussion of the Owasco culture and its relation to Iroquois origins (by Ritchie and others).

The will to do something about problems of Iroquois research was manifest in increased attendance, in an attitude of genuine interest that marked the discussions, and in reports of research accomplished since the first conference: by Speck, Dodge, Witthoft, and Fenton in Ethnology; by Voegelin and associates at the summer Linguistics Institute on the Seneca language; by Parker on history; and by Kidd, Schaeffer, Ritchie, and McIlwraith in archaeology. It is hoped that new projects and an opportunity for collaborative research will appeal to the scholars who were welcomed to the conference this year.

Those present included: Disher, Cleveland; Hout, Columbia; Carl Guthe, Albany; Stout, Syracuse; Parker and Ritchie, Rochester; Plassman and Hirscher, St. Bonaventure; G. Brown, Emmerson, Kidd and McIlwraith, Toronto; Hatt, Cranbrook; Griffin, Jones and Witthoft, Michigan; MacNeish and Ted Guthe, Chicago; Schaeffer, Harrisburg; de Laguna, Bryn Mawr; Wallace, Annville; Carpenter, Speck and Stearns, Pennsylvania; Johnson, Andover; Dodge, Salem; Hadlock, Bar Harbor; Setzler and Fenton, Smithsonian Institution.

The Conference has so far avoided formal organization, and it has no officers; it exists to promote Iroquois studies and as a vehicle for discussion and informal exchange of information. *(William N. Fenton.)*

REPORT ON THE "FIRST CONFERENCE OF ARCHAEOLOGISTS OF THE CARIBBEAN"

The meetings of the "Primera Conferencia de Arqueólogos del Caribe" took place in Honduras under the auspices of the government from August 1 through 10.

The congress was initiated by the "Sociedad Colombista Panamericana" in Havana, Cuba, in cooperation with the "Unión Interamericana del Caribe," invitations being sent directly from Havana. The aim of the meeting was to stimulate interest in and foment more knowledge of the archaeology of the Antilles and the Central American mainland, and by so doing to bring to light heretofore unknown cultural links between the islands and the entire Central American area. The Honduran Government invited the Congress to carry forth its proposed reunion on Honduran soil. As a basis for discussion, the principal theme choosen was "The Mayas of Honduras and their Connections with the Countries of the Caribbean."

There were sixty-nine official delegates representing the following countries: Argentina, Colombia, Costa Rica, Cuba, El Salvador, Guatemala, Haiti, Honduras, Mexico, Nicaragua, Panamá, Puerto Rico, República Dominicana, and the United States. The Hondoran government paid the way from the place of origin of the majority of the delegates, and paid the expenses of and hospitably entertained all the delegates during their entire stay in the country. Courtesies included the dedication of a park on the hill of "El Picacho" outside of Tegucigalpa, numerous festivities, and air transportation from Tegucigalpa to the north coast and to the famous ruins of Copán in the West.

The Minister of Education of Honduras, Don Angel G. Hernández, was elected President of the Congress, and the Cuban historian, José Lucianao Franco y Ferrán, Secretary General. Inauguration and closing acts, as well as some sessions, took place at the National School of Fine Arts ("Escuela Nacional de Bellas Artes") in Tegucigalpa. Sessions were also held at the "Escuela Agrícola Panamericana" in the Zamorano Valley, at the local museum in the Comayagua Valley, and at the "Escuela Francisco Morazán" in San Pedro Sula, and on the acropolis in the ruins of Copán.

Visits were made to some mound groups in the flood plain of the Comayagua River, to Los Naranjos on Lake Yojoa, and to the ruins of Copán, where not only were the monuments and structures examined and various papers read, but also a memorial service was held for John Owens, one of the first students to visit the site, who subsequently died and was buried there.

The "Sociedad Colombista Panamericana" will publish a report of the Congress and some of the papers presented. Numerous recommendations were made, one of the most important of which, as far as Central America is concerned, has already been put into effect. This is the establishment in Honduras of a national "Institute of Anthropology and History" ("Instituto de Antropología e Historia") under the Ministry of Education. The Institute, which was founded in September through presidential decree, is scheduled to have a professional personnel. Its aims are:

1) Exploration of the archaeological zones of Honduras.

2) The vigilance, conservation, and restoration of the historical, artistic, and archaeological monuments in the country.

3) Scientific, artistic, anthropological, and ethnological investigations among the indigenous populations of the country.

4) Publication of the data gathered from the above investigations.

The Mexican archaeologist, Cesar Lizardi Ramos, has

been contracted by the Honduran Government to give a free course in Maya archaeology in the University of Tegucigalpa, with a view to stimulating interest and to create the formation of a group of professional anthropologists. Two Hondurans, Jesús Núñez Chinchilla and Lauro J. Zavala, have been granted scholarships in Mexico by the Mexican government to study ethnology, archaeology, and the formation and management of museums.

Another recommendation of the Congress, namely the creation of a museum of colonial and religious art in the city of Comayagua, with the object of cataloguing and conserving the works of art in the former capital, has also been carried out by presidential decree.

It was decided that the "International Conference of Archaeologists of the Caribbean" will meet yearly, alternatively in the Antilles and on the Central American mainland. It was tentatively suggested to change the name "Arqueólogos" to "Antropólogos," thereby giving a broader significance to the Congress. No announcement has yet been made of the next reunion. (*Doris Stone.*)

MIDDLE AMERICA

With the hope of obtaining more definite information concerning the problems of relationship between the Middle American and Southeastern areas, a survey of the Mexican State of Tamaulipas has been conducted for the University of Chicago by Richard S. MacNeish and his wife. The following notes on the progress of the work are taken from a report by Mr. MacNeish, dated February 26, 1946.

The area between the Soto la Marina and San Fernando rivers has been surveyed, as well as Cameron County Texas. Fifty-seven sites have been located. Fifty-two are of the small non-pottery camp type containing flint chips, projectile points, and quantities of shell but with little or no pottery. The sherds that have been found bear practically no resemblance to any known wares, but a few pieces are slightly suggestive of early mission ceramics from Texas and others of sherds found further south in the Sierra de Tamaulipas. The projectile points appear to resemble those of the late phase of the Central Texas cultures. Four sites, one at La Pesca, at the mouth of the Rio Soto la Marina, two at the mouth of the Arroyo Cocheras, and one at the mouth of the Rio San Fernando are being tentatively called Tancol camp sites. They contain a series of ceramic types common to Periods V and VI of the Tampico-Panuco sequence and indicate a northward movement along the coast during these times. One site, Pueblito, is located further to the south in the Sierra de Tamaulipas and is thought to be characteristic of the remains in that area. It is a large site with twelve pyramids and about two hundred round stone houses. The pottery is different from any previously noted, but there are enough similarities to indicate a probable correlation with Period III of the Tampico-Panuco sequence. A number of interesting similarities to the materials of the Alto Focus of Texas have also been noted. Further excavation at the site has been planned.

This important survey was completed during March by an investigation of the area between the Rio Grande and San Fernando rivers and of the islands along the coast. (*G.F.E.*)

MUSEUM FÜR VÖLKERKUNDE IN BERLIN

Readers of AMERICAN ANTIQUITY will be interested to learn that Dr. Walter Krickeberg, Director of the Museum für Völkerkunde in Berlin, is alive and well. Dr. Robert St. Martin de Szabo, a friend of mine now attached to the Economics Division of the American Military Government, has visited him and given me a report on his status and that of the Museum and its collections.

Dr. Krickeberg is still Director. His home was wrecked and the Museum extensively damaged by bombs. Of the latter only the basement remains intact, and it is here that the offices are maintained. Most of the collections were saved. Some of the American collections which had been placed for safe-keeping in an air raid tower, however, were destroyed by fire during the Russian invasion.

I was particularly concerned about the fate of the Strebel collection inasmuch as this comprises material which has a bearing on the interpretation of the ceramic finds from Tres Zapotes. This collection was evacuated to Leipzig and later removed to Hamburg, where it is now in the custody of British authorities. (*C. W. Weiant.*)

THE ANNUAL MEETING

By majority vote of the Council, the annual meeting of the Society for American Archaeology will be held at Ann Arbor, Michigan the week-end of May 16 and 17 in conjunction with the meeting of the Central States Branch of the American Anthropological Association.

MEMOIRS

of the

SOCIETY FOR AMERICAN ARCHAEOLOGY

The following numbers may be obtained from the Treasurer, Frederick Johnson:

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1938. "The Sauk Valley Skeleton." *Bulletin of the Texas Archaeological and Paleontological Society*, Vol. 10, pp. 136–68. Abilene.

Citations from separate books:

JENKS, ALBERT E.
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